JANUARY / FEBRUARY 1994

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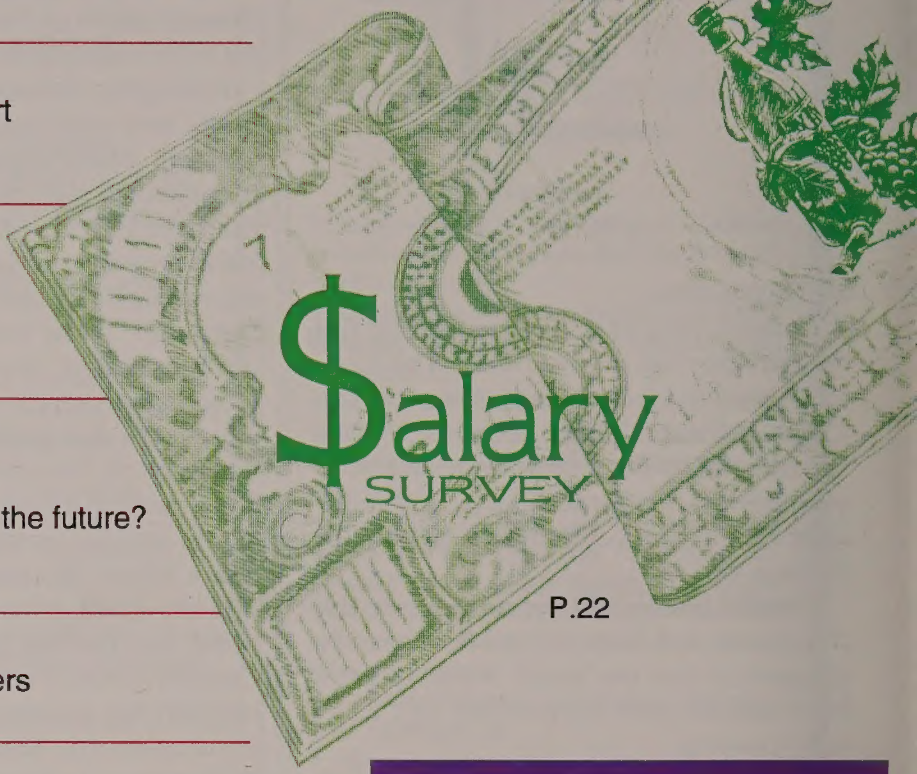
***COVER:** Heimbourg Vineyard in Turckheim, Alsace, France. Photo by Saur-Vision, and courtesy of Domaine Zind Humbrecht.*



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FRENCH-STYLE

AMERICAN OAK

Photo courtesy of Bluegrass Cooperage

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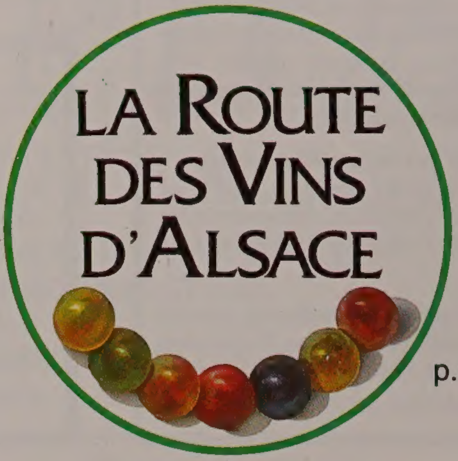

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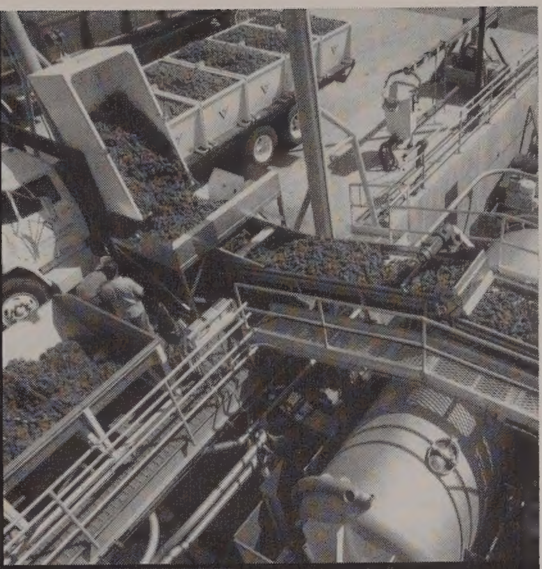
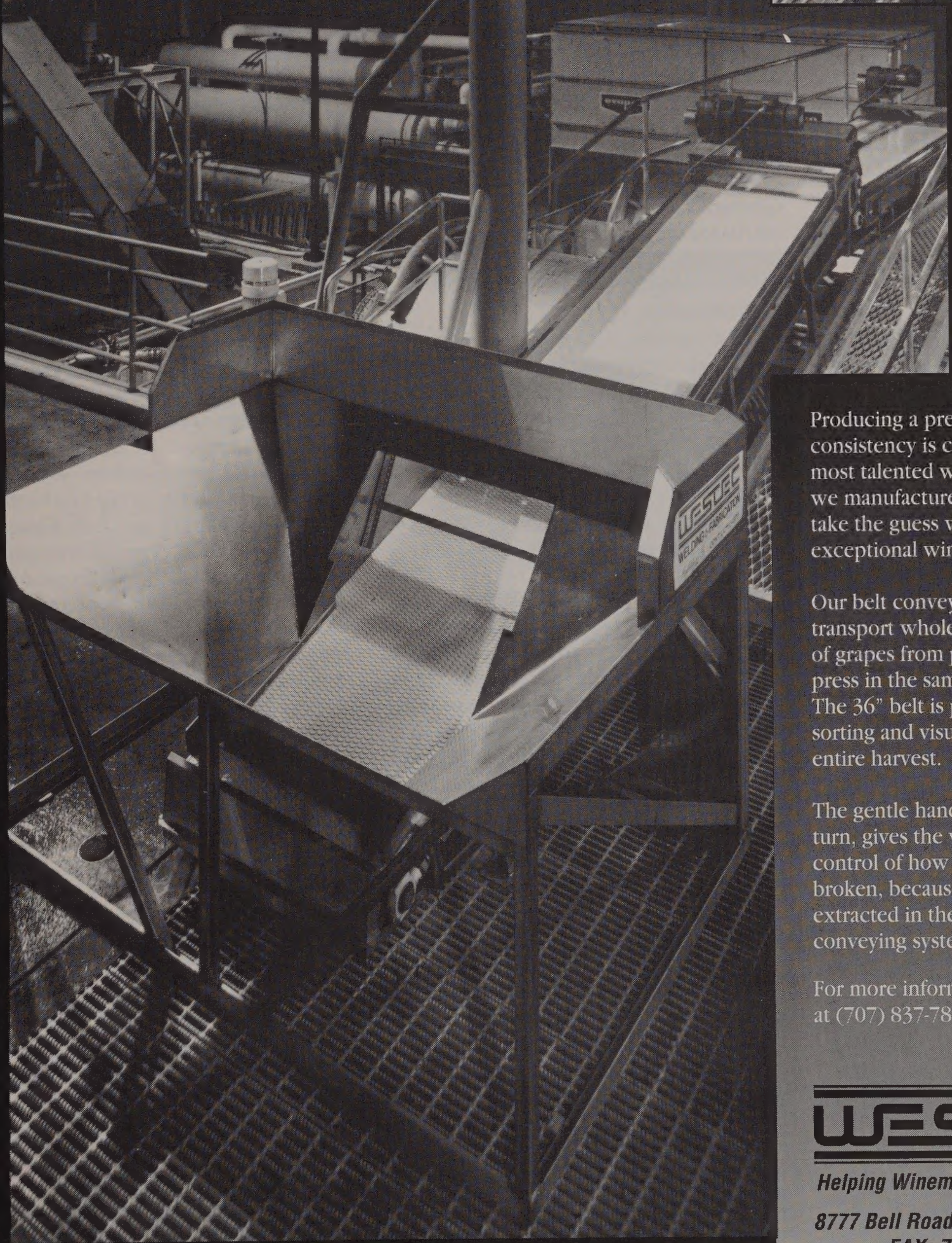
The only safer way to move your grapes is by hand.





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GEWURZTRAMINER

Fragrant wine of Alsace

(but not necessarily bone-dry)

By Eleanor & Ray Heald

"To understand Alsace Gewurztraminer is to understand the soil," Jean-Michel Deiss (Domaine Marcel Deiss, Bergheim) stresses. "The character of Gewurztraminer is best shown with some residual sugar. Therefore, it is totally incorrect to speak of an Alsace Gewurztraminer as bone-dry."

"Dry Gewurztraminer (GT) in the Alsace definition is between 0.5% and 0.7% residual sugar," reports Marc Kreydenweiss (Domaine Marc Kreyden-weiss, Andlau). "It cannot be made each year."

An opposing view is held by Andre Ostertag (Domaine Ostertag, Epfig) who does not mind being in a minority position. Ostertag studied in Burgundy and is very influenced by methods practiced in the production of white Burgundies. "My father founded the winery in 1966," Ostertag reports. "We have no traditions to follow. I created a style that suits my personal preference. It's bone dry, but if you make it this way, it should never be above 13% alcohol.

"Too many producers talk about aroma and never worry about a wine's tactility — which to me is the most important element in a wine."

Pierre Trimbach (F.E. Trimbach, Ribeauvillé) shares Ostertag's views and insists that dry GT means less than 0.5% RS and echoes Ostertag's opinion about alcohol levels at 12.5% to 13%.

The region

One of the most undulating in France, the Alsace region is also one of the sunniest. Sheltered by the Vosges mountains to the west and lacking a marine influence, it has a warm, dry, semi-continental climate with low annual rainfall averaging 17.7 to 19.7 inches.

In Alsace, diverse soils cover more than 32,500 acres with altitudes varying from 650 to 1,300 feet. The region is a rift valley zone on the hills of a land depression between the Vosges and Black Forest mountain ranges in eastern France.

The Wine Route of Alsace stretches for 75 miles over the hillsides and along the deep valley floors of the Vosges' eastern slopes. Over centuries, winegrowers of the region have mastered the task of matching soil profiles to varietals, such as Gewurztraminer (approximately 20% of all Alsace wine production), allowing full expression of *terroir*.

Soil diversity

"Geologically, Alsace is as mixed up as its history," maintains Jean Hugel (Hugel et Fils, Riquewihr). "Each village has many soil types, but only six to seven may be suitable for Gewurztraminer."

The following overview of the Deiss estate consisting of 120 individual vineyards spread along 12 miles of the Vosges foothills between Saint-Hippolyte and Sigolsheim illustrates the region's wide soil diversity. Deiss' vineyards cover nine separate villages and can be divided into four basic sections from north to south:

Saint-Hippolyte Vineyard is located in an area with granite substructure with very light, sandy top soil. From this site, the Gewurztraminer is fuller-bodied with significant spicy qualities.

Ribeauvillé Fault Vineyard is located around the villages of Rorschwihr, Bergheim, Ribeauvillé, and Riquewihr. Four major faults running north to south are crossed by nine others running east and west. This has allowed fertile marl, clay and limestone to mix and create a variety of soils depending on the topography, erosion, and slope. Eleven different types of geological soils exist, ranging from pure marl to limestone as well as gravelly soils. Gewurztraminers originating here have extraordinary complexity and are more often Vendanges Tardives (late harvest) and Selections de Grains Nobles (selected late harvest).

Mittelwihr-Beblenheim Vineyard is located on the first foothills rising from the plain. It is the edge of a marine basin where successive sea inflows laid down substrata of 1,600 to 2,000 feet of sand, overlain with light limestone soil. Gewurztraminer grown here has substantial acidity, but with finesse, elegance, and lightness. These wines are best drunk young to appreciate the charm of youth.

Bennwihr-Sigolsheim Vineyard is situated on a cone of sediments left by the River Weiss at the mouth of the Kaysersberg Valley and has alluvial soils. Round stones are mixed with fine sand, silt, and loess. These soils are more desirable for Riesling and Pinot Blanc, not Gewurztraminer.

"The site offers all the complexity in the wine; the grapes offer the character," Kreydenweiss remarks.

After saying this, let's consider that it may be misleading to reference Gewurztraminers made in California and other parts of the U.S. as Alsace or Alsatian-style. This is especially true if words indicating dry are used on the label. 'California, or other-named region, dry-style Gewurztraminer' may offer the consumer more information. Most Alsace Gewurztraminers are not bone-dry. It's also not correct to lump all Alsace Gewurztraminers together. Their style is very much a profile of the producer.

"You can't speak about an Alsace-style Gewurztraminer," Trimbach emphasizes. "Gewurztraminer grown on sandy soil is not the same as Gewurztraminer on chalky or clay soils. This is the major difference among producers. The secondary differences among producers are microclimates, then vineyard practices, and controlled yields."

Common elements

Primarily SO4, 5BB, 41-B, 16149, and 3309 rootstocks are used. Vines are spaced 1.5 x 1.5 metres or 1.3 x 1.3 metres, approximately 4,444 to 6,000 vines/ha depending on slope steepness. The predominant certified Gewurztraminer clones are 47, 48, and 643.

Producers use a *Guyot Double* trellis system. There are five fixed wires and two pairs of movable wires. Wires are at the following heights 60cm (24 inches), 90cm, 120cm, 155cm, and 190cm (75 inches). A machine called a *palisseuse* moves the catch wires and ties up the vines with a material called *ficelle*, a heavy boxing cord, which may be purchased in a biodegradable material.

Vines are pruned to 10 to 12 buds/cane or 20 to 24 buds/vine. In the region, *rognage* (hedging) is done manually in half of the vineyards and other vineyards are machine-hedged. Among producers interviewed, crop levels average two to three tons/acre, although the law allows five tons/acre.

If fertilizing is done at all, manure is used. "High nitrogen levels are a detriment to Gewurztraminer," Hugel contends. "Good judgment must be used with manure applications and the kind and width of grass grown between the rows."

In the last 10 years, *Brenner*, a new vine disease similar to black rot has emerged in some vineyards. It is kept under control with application of Mancozeb which is also effective against powdery mildew.

Whole clusters are pressed because it's easier to press with stems. The natural tannins from the stems are considered important for a balanced wine. When the grapes are healthy, most producers prefer natural yeast fermentation.

To offer U.S. producers of Gewurztraminer a comprehensive view of Gewurztraminer production in Alsace, **PWV** conducted on-site interviews with nine Alsatian producers.

VIN D'ALSACE
APPELLATION ALSACE CONTRÔLÉE
Domaine
MARCEL DEISS
Gewurztraminer
1990
Bergheim
alc. 14%vol.
750 ml
MIS EN BOUTEILLE AU DOMAINE
MARCEL DEISS & FILS PROPRIETAIRES A BERGHEIM (HAUT-RHIN)
PRODUCE OF FRANCE

Jean-Michel Deiss, winemaker

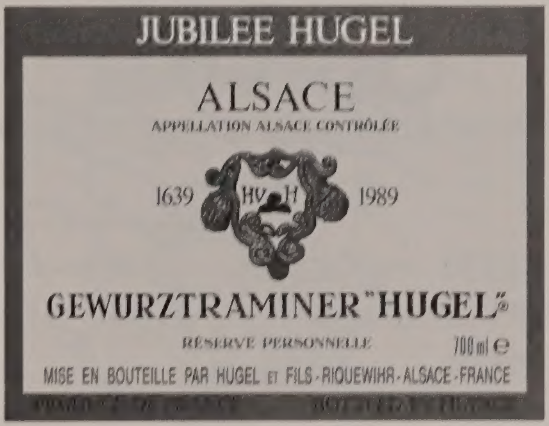
For the Deiss philosophy, it is important that pickings from different locations are vinified separately because each bottling should reflect the *terroir*, which in Deiss' opinion is the sum total of soil and microclimatic influences. To inform consumers, the term Grands Vins de Terroirs appears on the label.

It is also important to Deiss that geranium and carnation aromas be avoided in order to highlight lighter floral and spicy elements. In order to avoid aggressive characters, grapes are picked at ripeness levels determined by taste.

When discussing vinification, Deiss makes it clear that with such diversity of soils, it is criminal to use a standard winemaking technique or a single processing system.

At Deiss, the vineyard techniques, date of picking and harvest parameters, choice of fermentation vessel (wood or stainless steel), temperature and length of fermentation, frequency of racking, cellar regime, bottling, and bottle ageing are all tailored to the grapes' origin.

Deiss has a unique Gewurztraminer style with aromas and flavors of orange zest, not illustrated in the wines of the other producers. ✧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MISE EN BOUTEILLE PAR HUGEL ET FILS - RIQUEWIHR - ALSACE - FRANCE

Jean F. Hugel, winegrower

Highlighting fruit without heaviness on either the nose or palate impression and producing a wine with great delicacy is the primary goal at Hugel et Fils.

Jean Hugel confirms that Gewurztraminer is a 'nasty' varietal. It's subject to low set during cool or rainy bloom. It has natural overgrowth, which in humid harvest periods, causes rot. The latter is frequently not discussed as problematic because rainfall statistics over 40 years show October to be a consistently dry month. However, humidity is not discussed in these statistics.

Gewurztraminer has naturally low acidity, notes Hugel. It needs a moderate climate with a long growing season to develop mature flavors to upstage the lower acidity. He also maintains this is the reason why Gewurztraminer grown in warmer climates makes a boring wine, unless the fruit is mountain-grown.

The Hugel estate vineyards are located on the secondary steeper slopes around the village of Riquewihr. For the regular bottling, grapes are picked at 21.5° to 23.0° Brix. SO_2 at 35 to 40ppm is added to the juice in addition to bentonite.

Fermentation is completed in temperature-controlled, *foudre* (large, neutral oak oval cooperage), glass-lined tanks and stainless steel. Maximum juice temperature reaches 75°F in a fermentation lasting three to four weeks but in some years, as long as six months.

The wine is given one racking after fermentation completes. In the week before bottling, a prefiltration with Kieselguhr is done. A 1.2 to 1.3µ filter is on the bottling line.

Hugel maintains that the best GTs are somewhat closed at the start, but develop after four to five years in the bottle and retain lively fruit and spiciness for up to 20 years. ✧

Marc Kreydenweiss, winemaker

Kreydenweiss maintains that he makes the 'anti GT.' He claims to put the character of the soil before the character of the grape. This is most evident in his Kritt Gewurztraminer which has earthy, mineraly aromas.

He notes the difference between a great wine and a good wine: A great wine puts the soil first. From Kreydenweiss there's only one style Gewurztraminer — one with finesse, subtlety of aroma, and a solid finish with good length. Gewurztraminer, in his opinion, should not be aggressive with explosive perfume.

Kreydenweiss Gewurztraminer has the aroma of lychee nuts and roses. Flavors are floral and fruity, but not spicy, which is the uniqueness of the *terroir* in the Kritt vineyard on foothill slopes in the village of Eichoffen.

Kreydenweiss practices organic viticulture and uses only sulfur and Bordeaux mix as sprays. If you visit on the right day, you may find him preparing PRELE in his kitchen. This is his special mixture of boiled plant materials used to kill larvae attacking grape vines in Alsace.

Grapes are picked based on grape flavors and sugar levels producing a potential alcohol of 13% minimum. After pressing, 50ppm SO_2 is added to the juice. Natural yeast ferments the wine at a maximum temperature of 64°F in 3,000L to 6,000L *foudre* for 10 to 15 days.

After fermentation completes, 30ppm SO_2 is added and the wine is racked. An additional racking is done just before bottling. For clarification, a cellulose plate-and-frame filtration is done. ✧

Jacques Weber, winemaker

Jacques Weber strives to produce a wine with good acidity, finesse, and elegance. Powerful aromatics are not the goal. A Keuntz-Bas Gewurztraminer consumer should be able to discover the aromatics as they evolve in the glass.

There are two Gewurztraminer bottlings. Eichberg is more masculine and austere. It requires more time to evolve because the vineyard has deep soil with more clay. Pfersigberg is more feminine. It opens early with more aromatics because of the greater chalk content in the soil.

Weber is not willing to credit the soil for all the wine's complex elements. He maintains its partly the *terroir*, but by picking later (seven to 10 days later than many producers in the area) and using proper vinification techniques for more mature grapes, wines without a lychee nut character are produced, which he prefers.

Grapes originate from vineyards near the village of Husseren les-Chateaux. The 25-year-old vines in a chalky, marl soil profile offer spiciness that is not too powerful.

Grapes are picked when there are no green berries and all bunches have slightly pink tones. Directly after pressing, SO_2 is added at 20 to 30ppm. Juice is settled 12 hours before inoculation with active dry Alsace Mix yeast. Bentonite is added once fermentation starts.

During fermentation, lasting two to three weeks in 100-year-old, 40hL to 70hL *foudre* and 500hL stainless steel tanks, the maximum juice temperature reaches 72°F. After fermentation completes, all wine is racked to temperature-controlled *foudre* where it is aged on fine lees for two to three months. At this single racking, SO_2 additions are made at 60 to 80ppm.

In early March, one filtration with Kieselguhr is made. Wine is bottled ten months past harvest after a sterile filtration. ✧

Andre Ostertag, winemaker

Ostertag contends that the tradition of Alsace (and Germany) is 'grape-style wines.' The tradition of France (and Latin countries) is 'wines of *terrior*.' Ostertag has 70 vineyard parcels that divide winemaking into two categories: the 'vins de fruit' where the grapes is the most important taste element, and the 'vins de pierre' where the soil (*terrior*) is the most important taste element. Ostertag maintains that complexity can be lost in production or brought to higher levels.

He also believes that soil and climate are of equal importance and explains that there are hot years in Alsace, just like every winegrowing region. The late 1980s into the early 1990s experienced many. In hot years, wines get too powerful and have less complexity. Maturation of Gewurztraminer starts too early, acidity lowers, overpowering aromas develop, and the delicate ones are lost.

Noting that winemaking is not a process, Ostertag reported the following: SO_2 is added at the press only if the grapes are not healthy. Juice is settled 12 to 24 hours. Natural yeast is used in fermentation, but if rot is noticed, cultured Alsace Mix is used as the inoculum.

Fermentation, in stainless steel tanks with cold water temperature control, completes in three to four weeks with a maximum juice temperature of 68° to 72°F.

Depending on the vintage and whether the wine's body is sufficient, wine is aged on stirred gross lees. Frequency of stirring depends on the turbidity. Ostertag maintains that ageing *sur lies* offers the stylistic advantage of fatness and complexity, but cautions that the risk of covering fruit characteristics always exists.

SO_2 is added at 70ppm after the first of three rackings. If an assay reveals that fining is necessary, it is done with isinglass. Ostertag contends that filtration always influences the wine's structure and he prefers not to filter.

The Epfig Gewurztraminer is usually bottled in June and released in one to two months, but the Fronholz bottling is delayed until September following harvest and is given a year of bottle ageing before release. ✧

DOMAINES SCHLUMBERGER
ALSACE GRAND CRU
MARQUE DÉPOSÉE
PRODUCE OF FRANCE
KITTERLE 1989
13% vol.
GEWURZTRAMINER
e 750 ml
APPELLATION ALSACE GRAND CRU CONTRÔLÉE
MIS EN BOUTEILLE AUX DOMAINES SCHLUMBERGER
VITICULTEUR A GUEBWILLER (HAUT RHIN) FRANCE

Jean-Paul Sorg, winemaker

To ensure fruit aromatics with finesse and richness of flavors without heaviness are the main goals at Domaine Schlumberger. To achieve this Jean-Paul Sorg notes that it is necessary to have low yields from very steep vineyard sites where sandy topsoils allow root penetration for 16 to 26 feet down to granite subsoils. Tiled vineyards from the Roman period are terraced and maintained by stone walls.

In great measure, the *terroir* as well as the vintage contributes to the complexity of Schlumberger Gewurztraminer. Long

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fermentations lasting an average of four weeks and bottling only after two years also set the style.

Schlumberger Gewurztraminer is spicy, floral and complex with the fruity accents of quince and dark-skinned plums. It has good length and an aftertaste of fruits and flowers with a refreshing, pleasant bitterness. The Schlum-berger style is dryer with RS levels generally less than 0.5%

Organic viticulture is practiced via helicopter sprays. Bordeaux mix is applied pre-bloom. Sulfur is applied if bloom has disease pressures. Three more Bordeaux-mix sprays follow.

In a good vintage, picking parameters are predicated on total acidity, then sugar levels, with pH coming last, because the pH range stays in the range of 3.2 to 3.4 every year. Brix levels range 22.5° to 26°.

The first addition of SO_2 is made at 70ppm just after fermentation completes. A first racking is done in December and another follows in February or March after filtration with kieselguhr.

The wine is aged on gross lees one to two months. Lees are not stirred because it complicates clarification later on. Also, malolactic, which is not desired, could start.

Depending on the vintage, bottling occurs one to two years post harvest with release in three to six months. ✧

CUVÉE DES SEIGNEURS DE RIBEAUPIERRE
ALSACE
APPELLATION ALSACE CONTRÔLÉE
FRANCE
DEPUIS 1626
TRIMBACH
MARQUE DÉPOSÉE
13% alc./vol
GEWURZTRAMINER
750ml
MIS EN BOUTEILLES PAR F.E. TRIMBACH A RIBEAUVILLE - HAUT-RHIN - ALSACE
PRODUCT OF FRANCE

Pierre Trimbach, winemaker

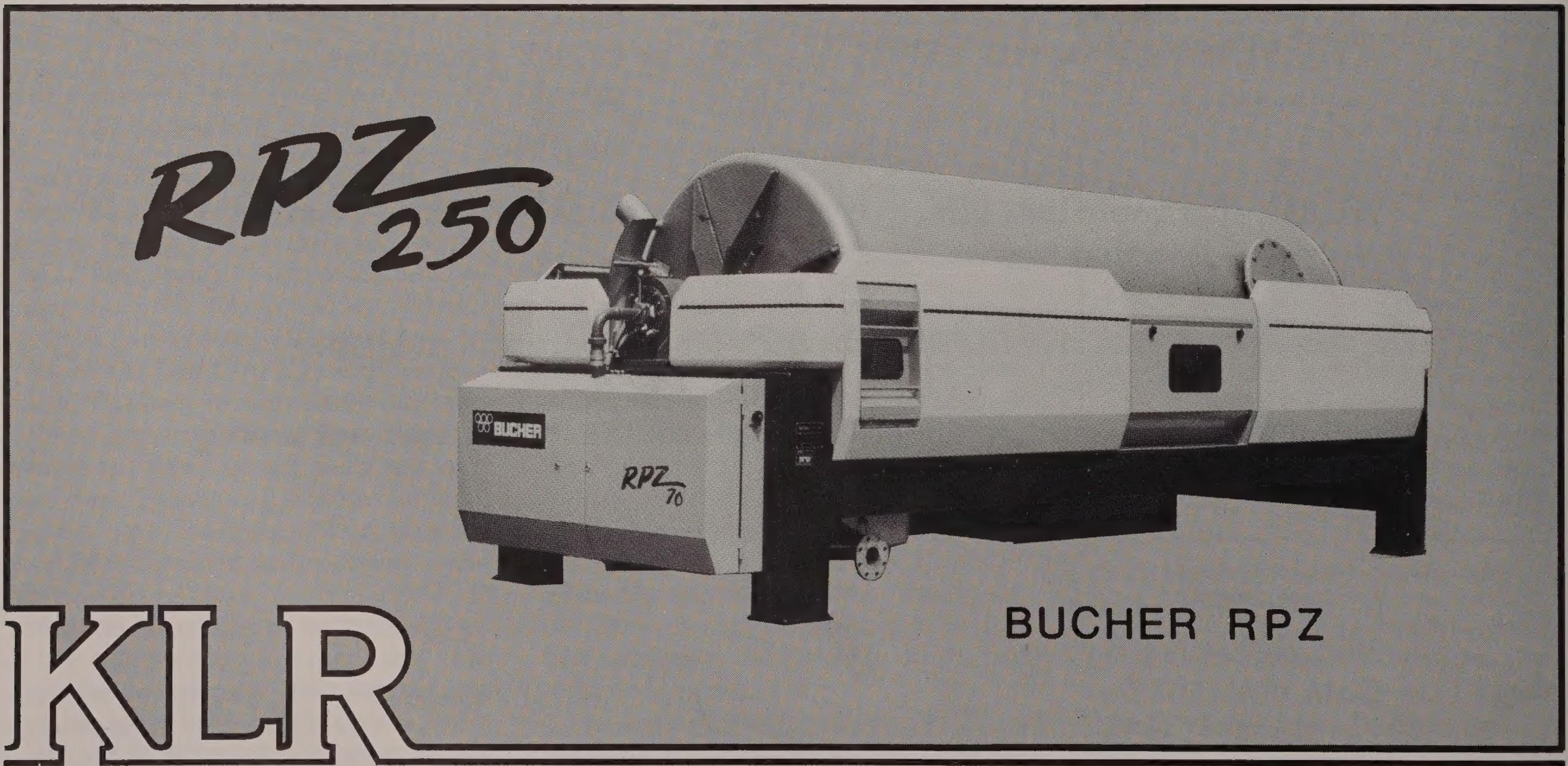
Pierre Trimbach contends that because the soils and microclimate of each Alsace village are so different, these two elements alone make up 70% of the differences among producers. He also maintains that a dry Gewurztraminer must have less than 0.5% RS and that bottle maturation is important, especially when the Gewurztraminer originates from vines planted in heavy soils.

Trimbach wants extract and character without heaviness and strives to avoid wines that are fat and fleshy.

Trimbach Gewurztraminer is sourced from several sites. Ribeauvillé Gewurztraminer is spicy, peppery, and dry with good acidity. Bergheim and Hunawihr are similarly floral and rich, but not as perceptibly dry as the wine from Ribeauvillé.

Trimbach adds 50ppm to 60ppm SO_2 to the juice coming out of the press and bentonites the juice after centrifugation. When cultured yeast is used, the preferences are EG-8, C-19, or D-24 which Trimbach considers the best to maintain some residual sugar.

Fermentation proceeds in both temperature-controlled *foudre* and glass-lined tanks reaching a maximum juice temperature of 75°F. After fermentation completes in eight to 15 days, tanks are topped and left for one to two weeks before the first racking (late November). SO_2 is adjusted to 40 to 60ppm.



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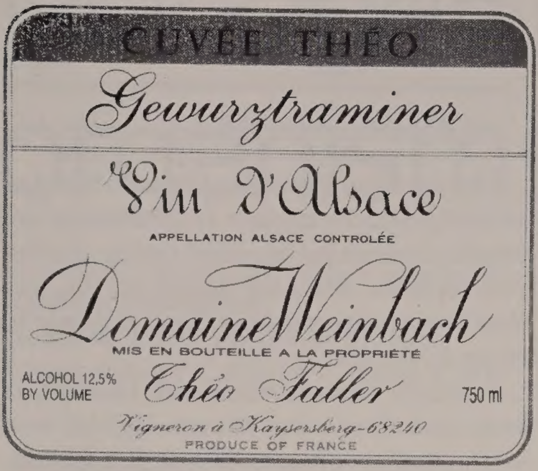
The wine is racked again somewhere between January and March and prefiltered with DE before final blending.

The wine remains in tank before bottling which is completed by September. A 0.65µ membrane is ahead of the filler on the bottling line. Wines are bottled aged two and sometimes three years before release. ✧



CUVÉE THÉO

Gewurztraminer

Vin d'Alsace

APPELLATION ALSACE CONTROLÉE

Domaine Weinbach

MIS EN BOUTEILLE A LA PROPRIÉTÉ

ALCOHOL 12,5% BY VOLUME

Théo Faller

750 ml

Vigneron à Kaysersberg-68240

PRODUCE OF FRANCE

Jean Mercky/Laurence Faller, winemakers

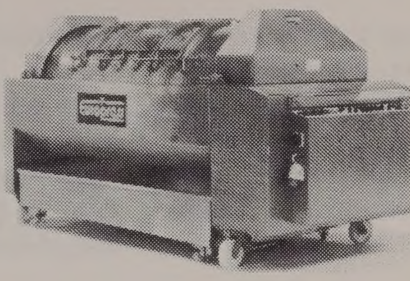
At Domaine Weinbach, every attempt is made to produce a wine with delicate aromas and flavors that are floral, in the rose petal spectrum, with lychee, exotic fruit, and spice character. Avoiding a heaviness that gives the wine a plump character is also a primary goal. These parameters are achieved by matching Gewurztraminer with the best-suited soils and by severe pruning to reduce yields.

The Grand Cru Furstentum, with limestone-clay soil, produces opulent wines of great aromatic complexity and ageing potential. Adjacent plots at Altenbourg of similar soil composition also allow full expression of Gewurztraminer grapes. Gewurztraminer grown on the plane surrounding the Clos des Capucins estate in gravel and alluvial soil produces the dryer style (0.8% to 1.0% RS).

Except for a small quantity which is destemmed when *marc* is produced, Gewurztraminer is pressed whole-cluster. After a small addition of SO_2 and a one-day settling, the juice is transferred to *foudres* (ancient oak casks). Fermentation occurs, without temperature control, in a naturally cool cellar and is complete in

Europress

a lot of advantages



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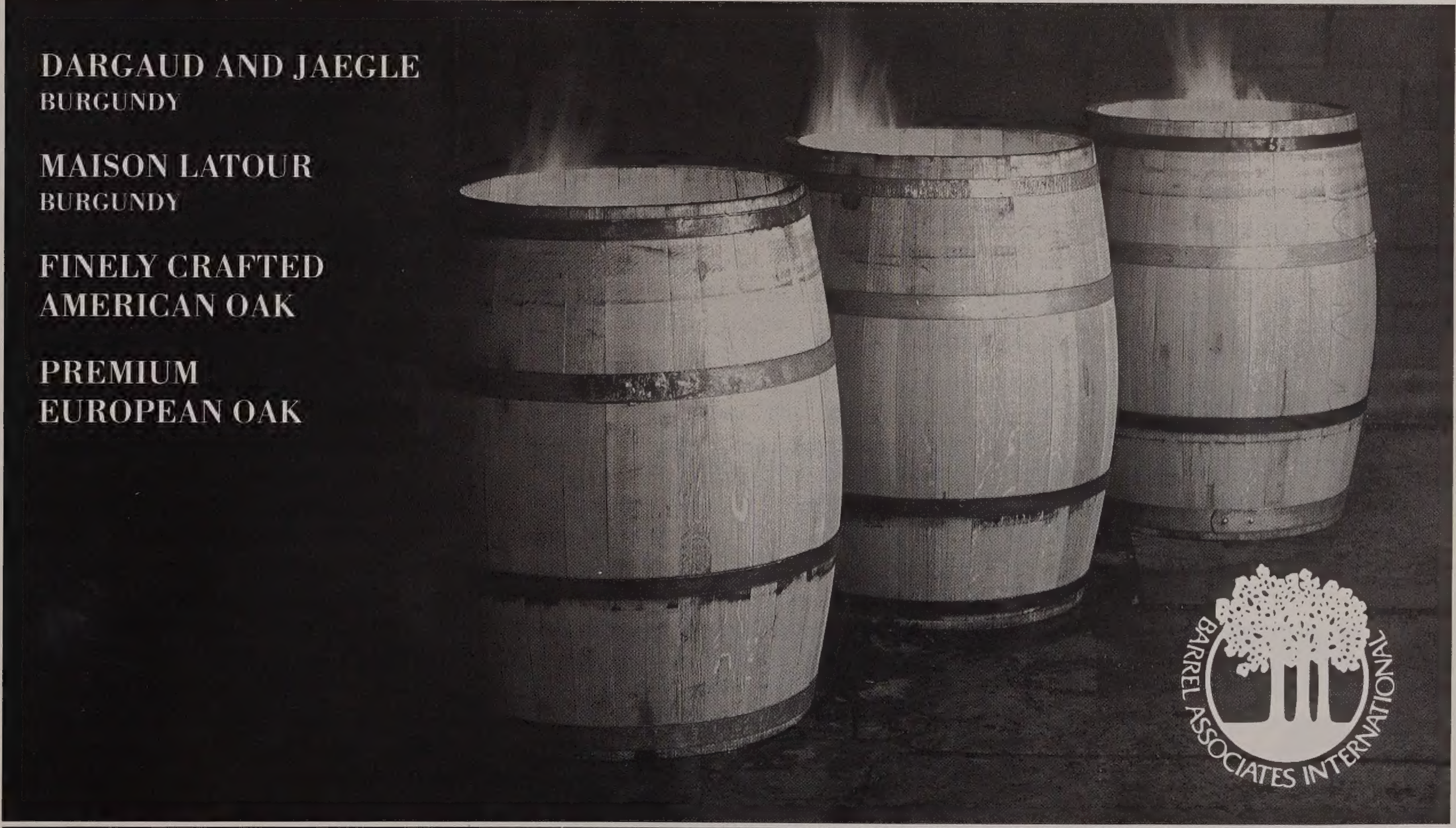

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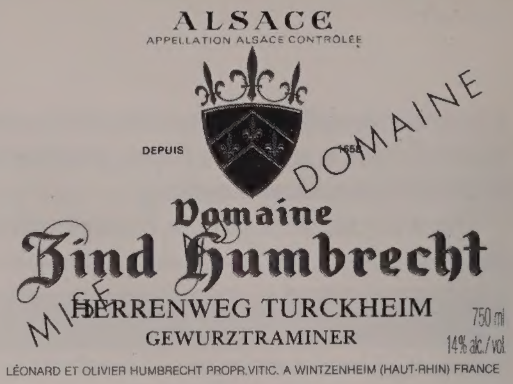
three to five weeks, but two months is not uncommon.

Once fermentation completes, the wine is racked off the gross lees and returned to *foudres* where SO_2 is added, not to exceed approximately 100ppm total at bottling. The wine is given a kieselguhr filtration. Between April and July, the wine is bottled with a 0.6μ membrane ahead of the filler.

The wine is released fairly soon after bottling and attains drinkability in six months to one year, but can improve with proper cellaring for up to 10 years. ✧



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Olivier Humbrecht, winemaker

Olivier Humbrecht maintains that because Gewurztraminer fruit aromas are fragile, it must be handled gently during production. He also points to the fact that Gewurztraminer is the last grape to ripen in Alsace.

It needs well-drained soil that holds heat and that's the reason lighter soil with chalky elements are preferred. Granite has too few minerals to offer unique fruit character.

Humbrecht stresses the need for low yields because of the vine's natural fragility especially at flowering.

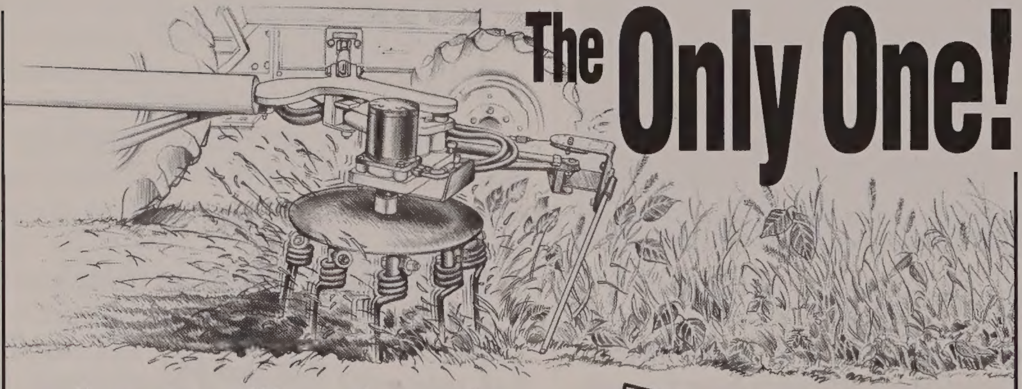
Complexity, Humbrecht says is site-specific because he produces all the Alsace varieties in the same way. He describes the various sites in five different Alsace villages as examples. Goldert (in Gueberschwihr) always has the fragrance of roses. Hengst (in Wintzen-heim) is closed, but has a big, spicy aftertaste. It is rather austere in its youth, but develops strong, spicy flavors during ageing. Heimbourg (in Turckheim) is a blend of both.

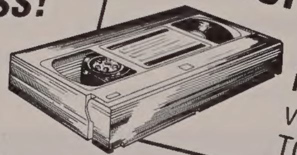
Clos Saint Urbain in the Rangen Grand Cru at Thann is the most southerly vineyard in Alsace and the most unique with its volcanic deposits mixed with some sandstone sediments. To reduce vigor at this site, 8,000 vines/ha were planted closer to the ground with total vine height at 70cm (27.5 inches).

Whole clusters with 30 to 45ppm SO_2 added are pressed and the juice is settled for 24 hours. Fermentation in temperature-controlled *foudre* takes two to three days to start with natural yeast and completes by the end of December. The first racking is done at this time.

The wine is returned to the *foudre* on fine lees where it remains until it is racked for bottling (anywhere from late June to early August). SO_2 levels are maintained at 20ppm to 30ppm. The wine receives one plate-and-frame and one cellulose filtration.

It is bottled with 0.4% to 0.8% RS and bottle-aged six months before release. Depending on the vintage, optimum drinking begins in two to three years and extends to eight years. ■





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SOIL FERTILITY:

Management of soil micro-organisms and organic matter

By Marc Buchanan,
Board of Environmental Studies,
University of California, Santa Cruz

Introduction

A good soil is a living soil. It is a habitat for many types of macro- (insects, worms, etc.) and micro-organisms (bacteria, fungi, etc.). Soil micro-organisms influence and are influenced by the physical and chemical properties of the soil.

Although a few soil micro-organisms may parasitize and/or injure plants, the vast majority perform beneficial functions. Micro-organisms are our natural waste-disposal agents. A major function of soil micro-organisms (or microbial biomass) is the conversion of carbon in organic residues to carbon dioxide, new microbial tissue and the formation of various metabolic residues. Thus, they are an important component of soil organic matter.

The links between organic matter and microbial biomass also directly affect the availability of nitrogen and other macronutrients required by crop plants.

Soil organic matter (SOM) is not a homogeneous component of soils. A number of different forms of SOM persist in soils. Humus (or the humic fraction) comprises the largest proportion. The beneficial contributions of humus to soil properties and fertility are well-known.

Routine management of organic matter will affect the humic fraction of SOM, although changes will occur slowly (within years). In comparison, the microbial fraction will respond rapidly (within hours) to added organic residues.

The quantity, quality, and placement of organic soil amendments directly affects all fractions of SOM. These general effects must be understood in order to maximize nutrient availability and conservation.

Modern agricultural soil management practices often do not fully utilize the potential of soil microbial processes for maintaining or enhancing nutrient availability to crops. The significant exceptions are the microbial conversion of fertilizer nitrogen (added as urea, anhydrous ammonia, or any ammonium form) to nitrate nitrogen, and nitrogen fixation by leguminous plants.

Soil management practices such as tillage, fertilization, and pesticide application directly affect the microbial biomass, both negatively and positively.

Soil and crop management practices that focus on soil organic matter and related biological components appear to be the best way to provide the buffering capacity needed to resist changes caused by human and natural factors.

Effective soil fertility management with organic residues or amendments requires some understanding of microbial processes and activity, because we are 'feeding' the microbial biomass as well as a crop. Crop nutrition can also be augmented with timely applications of a variety of foliar sprays and/or soil-applied solutions. However, these practices should not be regarded as 'required' inputs as much as an additional tool for fertility and nutritional management.

Informed organic matter management practices can improve the effectiveness and cost efficiency of other production inputs (i.e. fertilizers, water) and are critical components of sustainable soil management.

The use of cover cropping for nitrogen fixation and soil structure management increases reliance on microbial processes in agricultural soils. Below, I will limit the discussion of organic matter management and micro-organisms to general aspects regarding nutrients and soil structure.

Soil organic matter

While not essential to plant growth, SOM contributes indirectly towards fertility due to its influence on physical, chemical, and biological properties of the soil. These influences are universally recognized as:

- Darker color which affects soil warming in temperate regions.
- Improved soil aggregation, pore size, aeration, drainage, and water-holding capacity.
- Acts as a reservoir and source of plant nutrients; improves cation exchange and chelation. Chelation is a process where micronutrients such as iron, copper, and other metals are chemically 'caged' by organic matter (humus and other organic compounds). In this form, they are easily released or available for plant uptake.
- Enhances the pH buffering capacity.

SOM does not accumulate indefinitely in well-drained soils. An equilibrium level is attained through the soil-forming factors of climate, topography, vegetation and organisms, parent material (rocks), and time.

Most often, SOM levels decline when soils are first placed under cultivation (notable exceptions might be irrigated and fertilized desert soils). Many agricultural practices accelerate decomposition and mineralization (conversion to CO_2) of SOM such as:

- Cultivation — improves the aeration and moisture status, thereby increasing microbial activity.
- Irrigation — improves the moisture status, increasing microbial activity.
- Liming — increases activity of macrofauna (soil insects, worms and earthworms) and perhaps actinomycetes (which are thought to be more effective decomposers); makes some micro-metals insoluble which are important in stabilizing humic substances.
- Green manuring — greatly increases the numbers and activities of micro-organisms.

Any management system which annually increases the total carbon addition per unit area can increase the size of the SOM fraction in soils. Managing crops and soils solely for increasing the total amount of SOM may be desirable but does not have to be the goal of organic matter management.

We should recognize that SOM is actually a mixture of living and dead material, simple and complex compounds. Some are susceptible to decomposition while others are resistant.

A concept which I favor, divides SOM or soil organic carbon into three fractions:

- An active fraction consisting of the living microbial biomass and its metabolic products.
- A slow fraction that may be physically protected (i.e. within soil aggregates) and/or chemically protected (i.e. biologically resistant).
- A passive/resistant fraction which is chemically resistant and may be physically protected.

These fractions have been defined through various analytical approaches based on physical, chemical, or biochemical characteristics.

The soil microbial biomass represents only a small portion of the total SOM content. The microbial biomass may comprise 1% to 5% of the total soil carbon (SOM equals about 1.72 x Carbon), 1% to 4% of the total nitrogen, 0.5% to 12% of the total phosphorus, and 1.5% to 3.0% of the total sulfur in soil. While these proportions may seem small, the rapid growth and death cycles of the biomass (often just days) amplify their potential impact on nutrient availability.

Estimates of the amount of nitrogen held in microbial biomass in soils at any given time range from 36 to 1,100-kg per hectare (32 to 980 lbs N/acre). Thus, the microbial biomass can comprise a substantial pool of nutrients.

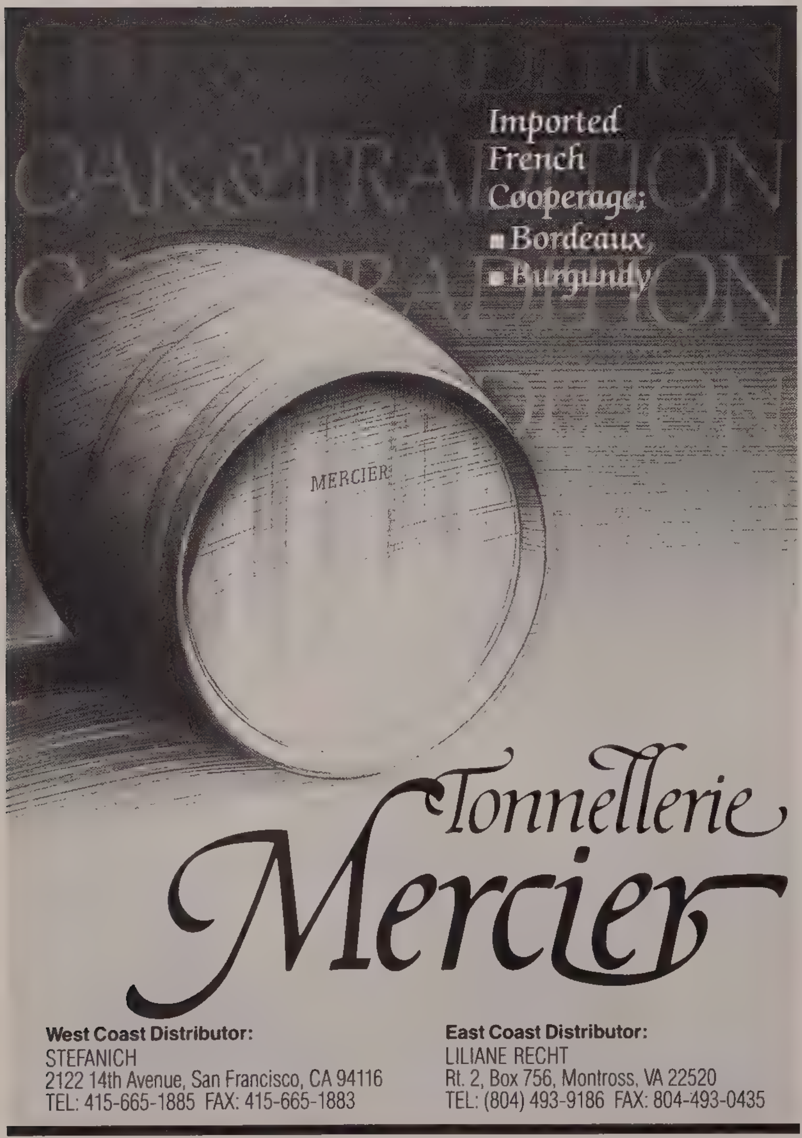
The dominant free-living components of the soil biota are the bacteria, fungi, and the macrofauna. Within each of these living components, there exists a broad range of physical (morphological) and physiological (biochemical) characteristics:

- Bacteria — heterotrophic (need organic C) and autotrophic (self-feeding, use CO_2)
- Fungi — heterotrophic, includes mycorrhizae associated with the roots of many crops.
- Actinomycetes — subgroup of bacteria with fungi features, heterotrophic.
- Protozoans — heterotrophic, feed on dead organic matter and predation of bacteria.
- Metazoans — or macrofauna, nematodes, worms, mites, spiders, insects; most prey on other micro-organisms and thus have a role in decomposition.

Microbial processes

Decomposition

Residues differ in their chemical composition. Organic residues from crops and amendments differ in their chemical composition. Herbaceous green matter has a higher protein and carbohydrate content than well-rotted compost, which may have a higher lignin and humic acid content. Carbohydrates, amino acids, and proteins are easily digested by soil micro-organisms.



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More complex molecules such as hemicellulose, phenolics, and lignin (found in woody residues) are more resistant to decomposition and can increase the microbial demand for soil nitrogen in order to digest them. Humus is a product of chemical processes and microbial decomposition and, as mentioned above, is quite resistant to decomposition.

Fertile soils with a large active organic fraction will have a significant amount of microbial cell residues and metabolites dispersed in water films bathing soil particles and roots of crops. Microbial decomposition of these materials leads to the formation of many transitory and chemically simple organic compounds, possibly containing nitrogen, phosphorus, sulfur, and other nutrients, which could be absorbed by roots.

The area immediately around a developing root is a zone of intense microbial activity. It is a microhabitat where crop absorption of these metabolic products will likely occur.

Mineralization

Mineralization refers to the conversion of organic compounds to inorganic compounds or ions. Thus, mineralization is the conversion of organic carbon to carbon dioxide, organic nitrogen (proteins) to ammonium or nitrate, and/or organic phosphorus or sulfur to phosphate or sulfate.

Much emphasis is placed on the importance of nitrogen mineralization in managing nitrogen from organic inputs. The mineralization of organic nitrogen to ammonium is a key process leading to enhanced availability of nitrogen to the microbial biomass.

Indeed, "the bugs go to dinner first"; increased microbial growth is supported by absorption of mineralized or fertilizer nitrogen. From a cropping viewpoint, this immobilization of nitrogen is considered to be negative. However, the uptake of nitrogen by the microbial biomass may also conserve nitrogen in soil by placing it in this protected, (*i.e.* from leaching) yet active fraction.

The formation of ammonium during microbial decomposition (by heterotrophic microbes) or the addition of ammonium-containing fertilizers provides a key substrate to the autotrophic micro-organisms that convert ammonium to nitrate (nitrification). Limited availability of ammonium will limit the activity of these nitrifying bacteria, thus limiting the amount of nitrate formed with time.

Much of the conventional thought concerning nitrogen nutrition of crop plants centers on the quantity of nitrate-nitrogen available in the soil solution. Most of our crop varieties are bred in soil environments where nitrate is in large supply. As it is almost completely soluble in soil water and the inevitable product of a microbial process, it is considered a very available form.

However, excessive nitrification or nitrate additions to soils can lead to lowered crop utilization efficiencies if conditions favoring leaching or denitrification exist.

Soil micro-organisms are also intimately involved in the availability of soil

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phosphorus and sulfur. They participate in the solubilization of inorganic forms and the mineralization of organic forms. They also may have a negative effect on soil solution concentrations during periods of high growth and activity.

Microbial uptake of soil phosphorus may be advantageous as it 'protects it' from precipitation and fixation reactions with soil minerals. In many soils, mineralization of organic phosphorus and sulfur can supply the total needs of crops.

Aggregate formation and stabilization

Soil structure is a major component of soil fertility. Soil structure and its stability is the determinant of soil tilth. Tilth refers to the general physical condition of the soil. Good tilth reflects good aggregation of particles which allows air and water entry, and root penetration.

Soil carbon is believed to be an important component of soil quality because of its influence on aggregate stability, which directly affects water infiltration, retention, and runoff. The resistance of aggregates to physical breakdown due to tillage or water is a critical requirement for sustained soil fertility.

Microbial biomass and activity are critical to the formation and stability of aggregates. Polysaccharides, a type of carbohydrate by-product of microbial activity, form the sticky binding agent. While these binding agents may eventually be decomposed or mineralized themselves, continued microbial activity ensures the persistence of aggregates. Hyphae of fungi which bridge and bind particles are another aggregate-forming agent.

Organic matter quality

The largest fraction of organic matter entering the soil is that contributed by plant residues. Often ignored is the significant mass of carbon entering soil via root growth and decomposition, which can make up to 50% of total carbon photosynthetically fixed.

Plants contain carbon as 15% to 60% cellulose, 10% to 30% hemicellulose, 5% to 30% lignin, and 2% to 15% protein. Soluble substances (sugars, amino and other organic acids) may constitute up to 10%. These soluble substances are readily leached from the residues and are quickly utilized by soil organisms. The distribution of these chemical constituents will vary according to the plant species, nutrition, and age.

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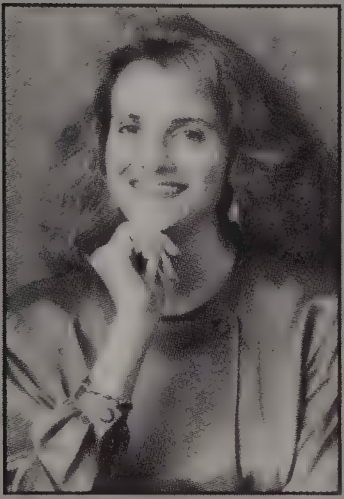

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Animal manures also contain these materials, but due to previous digestion, the proportions may vary. Cattle manures contain a higher percentage of lignin, while poultry manures contain more urea and other volatile and easily decomposed organic compounds. Composted wastes will have high amounts of resistant organic matter including lignins and humic materials. Roots of annual crops have a more resistant composition than the herbaceous tops.

Given the range of chemical composition of various organic residues, it is apparent that these materials will have varying qualities. Residue quality in relation to nutrient management might be defined from two perspectives; the quality parameters favoring nutrient availability and those favoring nutrient (particularly nitrogen) conservation.

Managing the active fraction of SOM

Historically, approaches to regulating crop nutrient availability through organic matter management have involved: manipulation of existing soil organic matter through tillage or soil drainage; crop residue burning or placement on or in soil; production of green manure, cover, and sod crops; soil amendment with animal wastes and composts.

It is important to consider the management of the active fraction of SOM. Management which directly affects the quantity, quality, and placement of organic matter inputs also controls the availability of energy (or food) to the soil microbial biomass.

Increasing the total carbon addition per unit area can increase the size and potential of the active fraction. However, the quality of the organic matter input must be considered in fulfilling such an objective. For example, cover crops or green manures can decrease SOM-levels due to their stimulation of microbial activity which can lead to increased mineralization of SOM.

The degree of soil physical disturbance (tillage) associated with management systems influences the habitat for biological activity through effects on soil bulk density, pore-size distribution, and aggregation. Using these tools with an expanded view of SOM and organic matter quality will lead to more informed soil management practices.

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can be combined with the use of nitrogen fertilizer so that some portion of the fertilizer nitrogen is absorbed and temporarily immobilized by the microbial biomass. Release of that nitrogen will occur following the immobilization at a slower rate, more in synchrony with plant demand.

High nitrogen green manures which are digested rapidly by microbes might serve the needs of an early crop, and supplement the following crop. Uptake and assimilation of phosphorus into the organic matter of cover crops or crops can improve the availability of soil phosphorus following their incorporation in soil due to microbial absorption and mineralization.

Conversely, enhancing the immobilization potential of soil can reduce the nitrification potential, thus leading to nitrogen conservation. The incorporation of resistant, woody residues at the end of the cropping period can rob the nitrifying bacteria of available ammonium and limit the nitrate available for leaching or denitrification loss from soil.

Tillage and moisture management can be another approach to maximizing the potential of microbial immobilization and mineralization processes to provide crop nutrition.

Tillage, which disrupts the microbial biomass and aggregates, increases decomposition and mineralization.

Drying of soil followed by rewetting also can result in significant increases in decomposition and mineralization of active fraction organic matter.

The coordination of tillage with irrigation management can be another way to regulate microbial processes to enhance soil and fertilizer nutrient utilization efficiency by crops.

Developing more informed organic matter management practices will require new ways of analyzing the soil fertility status. While there will be no replacement of most standard soil analysis systems, the grower must consider the soil as a system and habitat for microorganisms.

In order to maximize the biological potential of soil, the requirements for the biota must be optimized. Monitoring of soil structure, oxygenation, salts, and some assessments of the microbial biomass or potential could be included in the standard methods.

A part of my research examines various methods of assessing the interaction of organic residue quality and soil microbial processes. We have no conclusions yet, but believe that there will be some utility to assessment of microbial and/or active fraction potential in soils.

Informed SOM management practices

A critical component of sustainable soil management systems is enhancement of the microbial potential of soils. Many of the specific approaches will involve the partial or complete substitution of biologically-fixed nitrogen from legume crops and recycling of various organic residues for fertilizer N. Thus, in terms of nutrient management, these

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systems rely more on carbon cycle dynamics (i.e. decomposition and mineralization) than inorganic fertilizer-dominated systems.

Crop and nutrient management systems could be adopted in which the timing of nitrogen release during decomposition and nitrogen immobilization (storage) is managed in relation to crop requirement for nitrogen. Thus, nitrogen could be conserved in the active SOM fraction and, to a degree, protected from leaching and denitrification, yet be available to crops.

Tillage can be considered to be an important technique for managing stored soil nutrients. Although not a simple solution due to differences in soils, climate, crops, and macronutrients in question, it should be possible to devise management systems which use tillage to optimize the synchrony of crop needs, soil nutrient release or storage. Achieving such synchrony is a complicated task even when only considering one element such as nitrogen.

Approaches to organic matter management should also integrate the use of differing organic residues and fertilizers. By supplying diverse food/energy sources to the soil microbial system and recognizing quality/quantity interactions, we can ensure resilient soil systems.

Enhancing the microbial potential of soils and maximizing the general benefits of SOM can potentially enhance the efficient use of any other fertility or crop nutrition input. Such practices are the foundation of sustainable soil management. ■

(The above presentation was given at the Sustainable Soil Management Symposium, April 22, 1993, sponsored by the UC Sustainable Ag Research & Education Program, UC Davis.)

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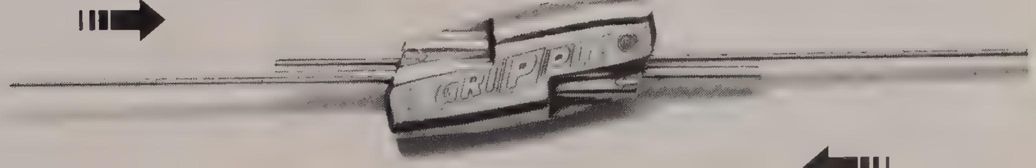

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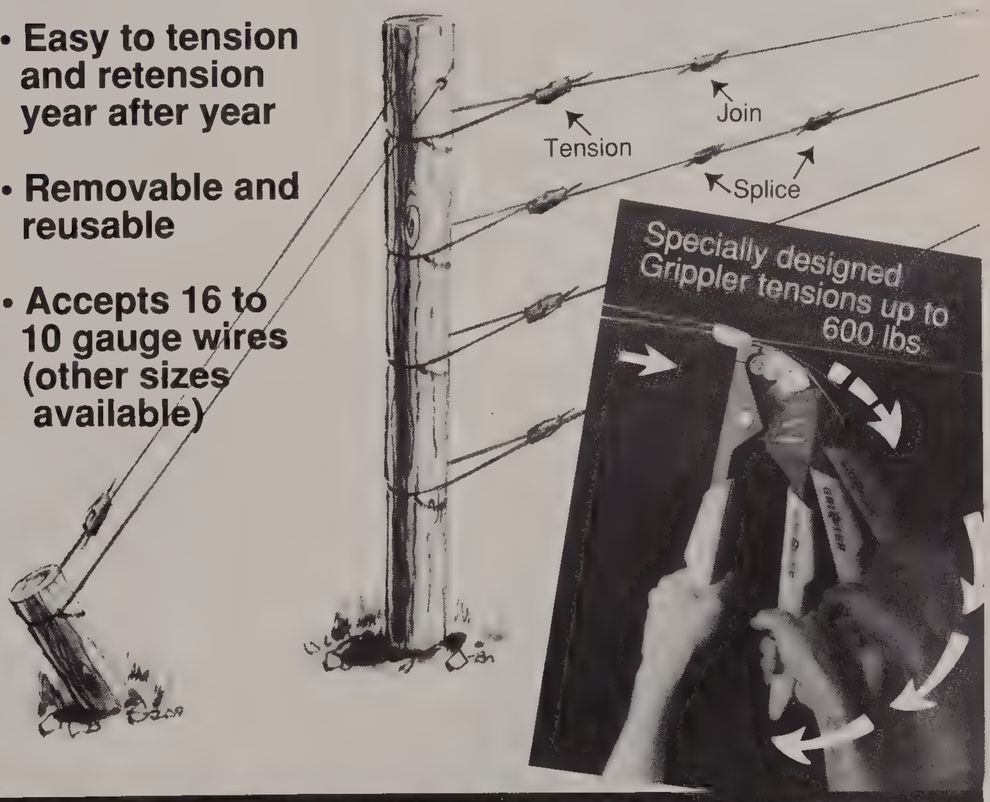
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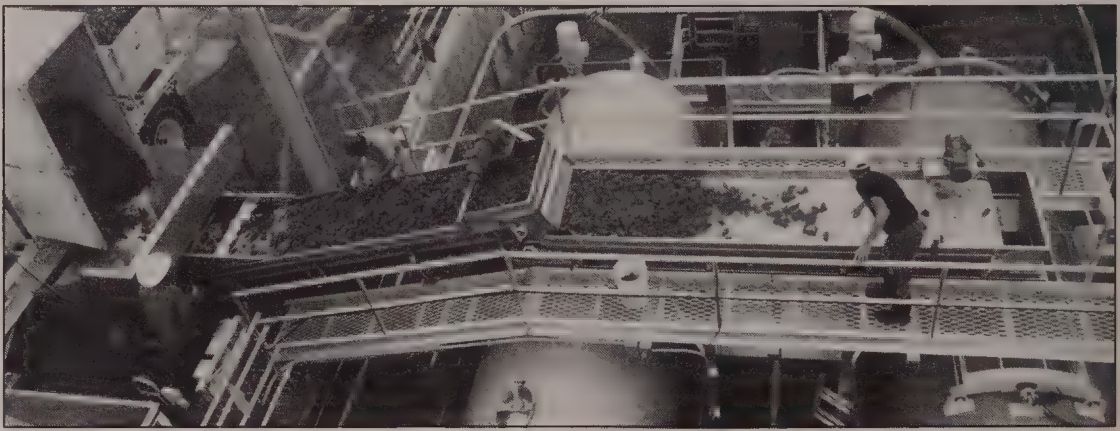

Clos du Bois Winery (Healdsburg, CA) has installed a system to transfer whole clusters of grapes directly from 2-ton valley bins to two Diemme AR260/F tank presses via a belt conveying system, built and installed by WESTEC.

The WESTEC conveying system fulfills every winemaker's dream to deliver grapes to the press in whole, undamaged clusters, rather than as a mass of macerated skins, seeds, and stems.

Each bin of grapes is dumped directly onto the 36-inch wide belt via the receiving hopper (dimensions: 5-½ feet X 8-feet at the top) which works like a large funnel. The first belt is a PVC, crescent top conveyor set at a 15° incline to deliver whole clusters to the press nearest the receiving hopper. The crescent pattern of this conveyor belt can deliver a surprisingly large amount of juice to the press. There is a sump below the hopper to catch juice overflow.

The second conveyor is a smooth, white nitrile FDA-approved belt that spans the horizontal distance between the doors of both presses.

The choice of dumping grapes into either press is accomplished by use of a pneumatic cylinder that can move the entire horizontal belt assembly back and forth over the press doors. For example, when the first press is being filled, clusters fall from the incline belt directly into the press because the horizontal nitrile belt is moved to create a gap between the belts that is just the size of the press door. If the second press is to be filled, the pneumatic cylinder extends to position the horizontal conveyor slightly under the incline belt. Thus, the door of the first press is covered and grapes fall a few inches from the inclined belt to the horizontal belt and are conveyed to the second press.

Grapes are conveyed away from the receiving hopper very quickly. At Clos du Bois, the dumping time for a 2-ton bin is approximately two minutes. The speed of the conveyor is adjustable and potentially can handle up to 300 tons/hour. However, since whole clusters tend to 'mound' in the press, time must be taken to rotate the press in order to fill to full capacity (25 tons of whole clusters). Very ripe grapes that separate from the stems and machine-harvested fruit allow faster filling since the press fills more evenly.

Framework of the conveying system is fabricated entirely of stainless steel. The tubular frame makes for a very rigid structural piece of equipment. There are stainless steel drip pans to contain any grape material and juice that does not go into the press, and the sump below the hopper.

A catwalk was installed to allow easy access to the full length of the conveyor for cleaning but also makes the belts very easy to use as adjustable-speed sorting tables, if necessary. Having the stems as a press aid has reduced each press cycle by five to ten minutes and also increased gross juice yield by as much as 5%, according to preliminary estimates.

Most exciting for Margaret Davenport, Clos du Bois winemaker, is the much improved juice quality that results from this system. Chardonnay juice, in particular, shows a greater delicacy in the mouth and more intense fruit flavors, both effects due to a combination of lower total phenolics and a lower volume of high pH juice at the end of the press cycle. More evidence to support improved grape handling with this system is the fact that the juice lees were reduced by at least 40% and sometimes by as much as 60%. ■

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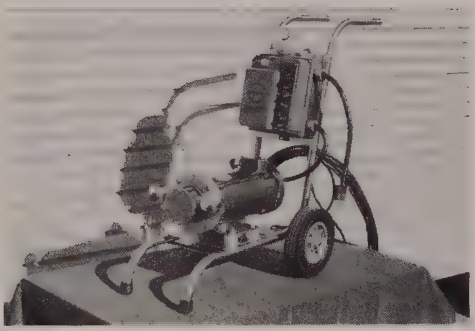

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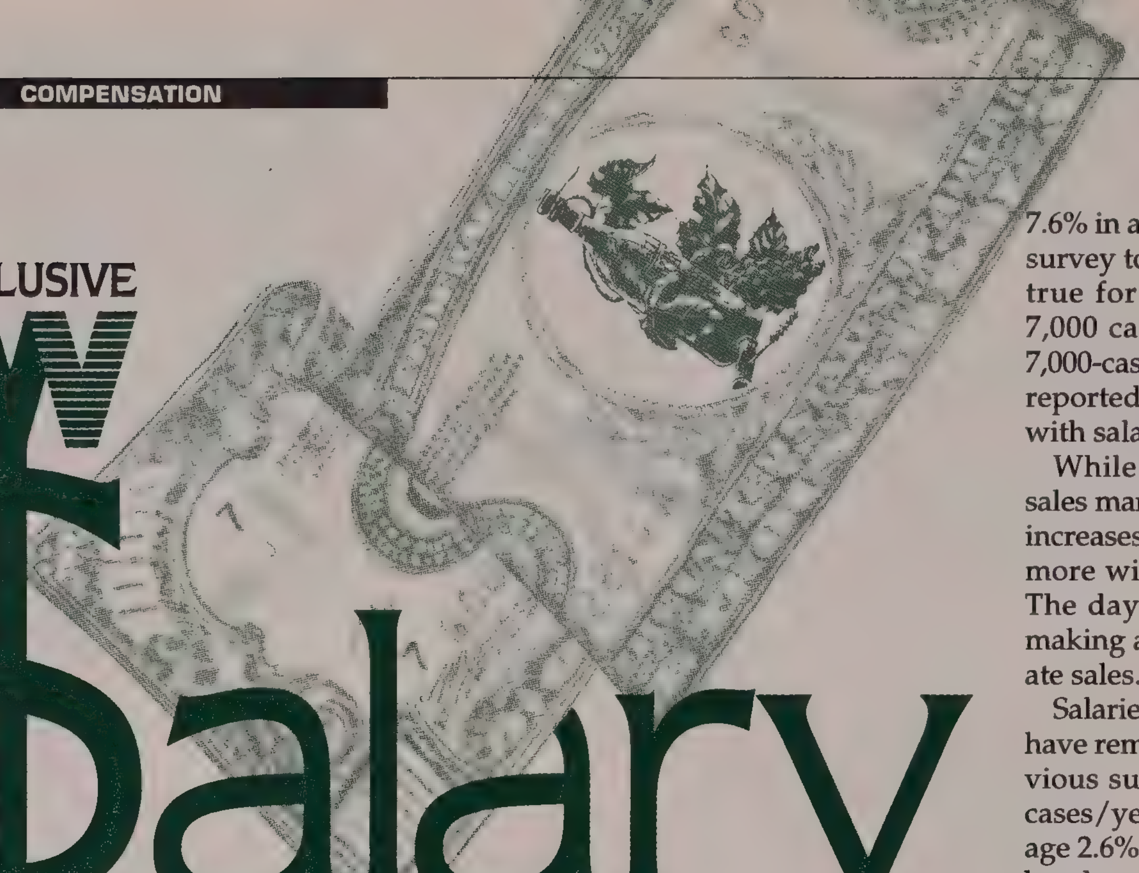


EXCLUSIVE PWV $alary SURVEY

By Jeff Sully,
Motto, Kryla & Fisher

Every other year, as a service to the wine industry, **PWV** conducts a salary survey of premium winery and vineyard employees with the help of wine industry accountants and consultants Motto, Kryla & Fisher of St. Helena and Healdsburg, CA. We believe that the information gathered in this, our third biannual survey, and previous surveys assists **PWV**-readers in long-range planning and financial decision-making.

With this survey, **PWV** expanded the scope of the positions surveyed, including sales, marketing, and financial, as well as production positions surveyed previously. The data was collected in October 1993.

The questionnaire was mailed to the **PWV** subscriber list and other industry sources and over 800 responses were received. While this is not a scientific survey, the anonymous responses do provide an indication of the range of salaries for a given position and winery size. In some instances, responses that indicated salaries were abnormally high or low were not included in the computations of replies.

The survey results present some broad but clear trends. As the industry matures, we're seeing more 'professional management' positions in smaller wineries. Full-time upper level management is no longer the sole domain of large organizations. Titles such as general manager, CEO, controller, and marketing director, among others, now appear in wineries in a wide range of sizes.

When compared to the previous survey published in the March/April'92 **PWV**, the greatest salary increases are no longer in the vineyard. Instead, sales and marketing are the 'hot' positions. This indicates wineries are paying more to attract talented sales and marketing people in response to increased competition, and consolidating distributor networks.

Salaries

Many wineries are finding that their brand is becoming more difficult to sell. Consequently, selling requires full-time monitoring and administration. This change in emphasis is most dramatic with the marketing manager position. Significant increases of 5.3% to 7.6% in average salary from the previous survey to 1993 were reported. This held true for all wineries producing over 7,000 cases/year. Even in the under 7,000-case/year category, some wineries reported having a marketing manager, with salary increases around 3.8%.

While sales managers and regional sales managers received smaller average increases (3% to 4%), there are more and more wineries adding these positions. The days are long gone when merely making a distinctive wine would generate sales.

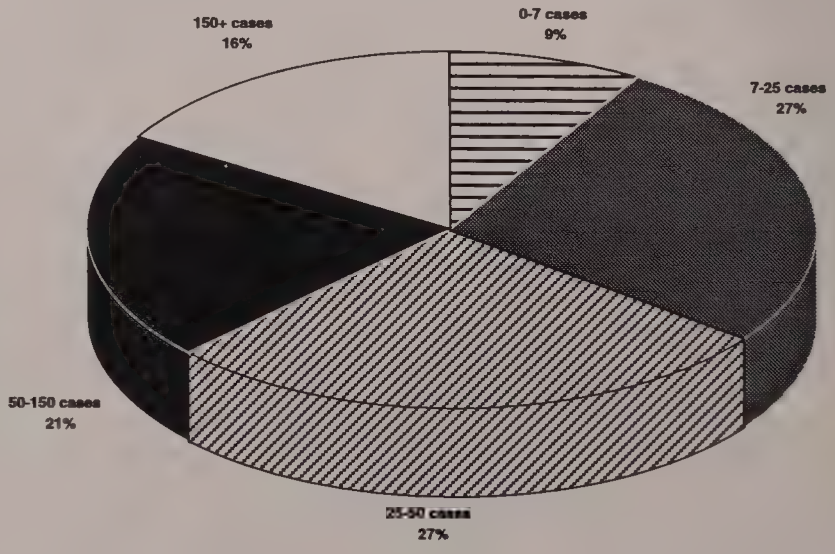
Salaries for general manager positions have remained unchanged since the previous survey. In wineries under 7,000 cases/year, responses showed an average 2.6% salary increase, an amount that barely covers inflation. These stagnant salaries were offset, however, by higher average bonus percentages (4.3%). In larger wineries, bonuses averaged 1.1%.

As winery size approached 50,000 cases/year, the general manager's average salary grew 6% to 7%. Above 50,000 cases/year, the rate of increase dropped to about 2%. There appears to be an inverse relationship between winery size and bonus as a percentage of salary. Smaller wineries find bonus programs to be a more practical component of the compensation package than larger wineries do. Perhaps, the higher salaries reported by larger wineries make bonuses a less attractive performance incentive or reward.

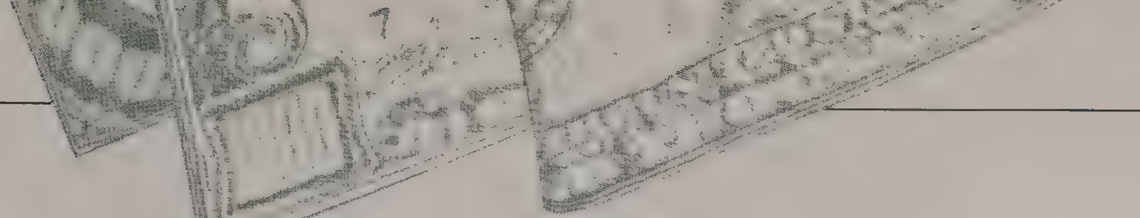
Winemaker salaries show little correlation between winery size and the increase in wages. These salaries in winer-

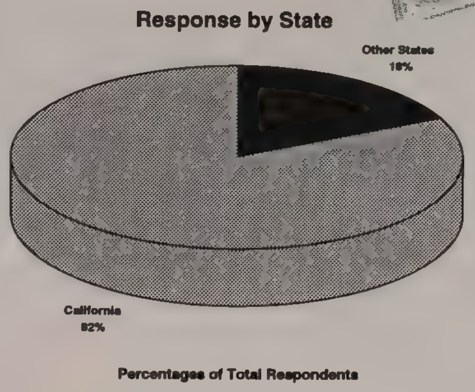
Responses by Winery Capacity

Annual Case Production in 000's

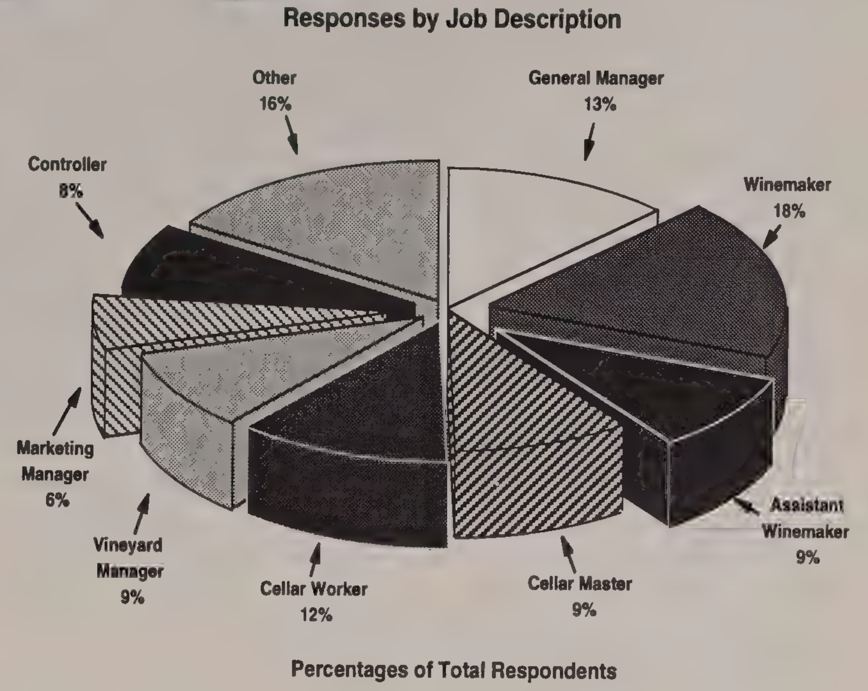


Percentages of Total Respondents




Response by State

Percentages of Total Respondents


Responses by Job Description

Percentages of Total Respondents

ies below 7,000 cases/year had the largest increase (9.2%), while they showed the smallest increase (2.8%) in wineries in the 7,000- to 25,000-case range. Larger wineries reported about a 4.5% average increase for winemakers. Production staff positions such as assistant winemaker, enologist, vineyard manager, and cellar worker showed an increase slightly ahead of inflation.

Benefits increasing

One very encouraging result of the survey is an expansion of health benefits. In 1993, 88% of the respondents reported that employees receive employer-paid health insurance compared to 77% in the previous survey. And 57% of the employers provide dependent care coverage.

Dental care has become an important part of the industry's basic health care coverage. Of those surveyed, 56% of the employees receive dental insurance. Family dental coverage is offered to 41% of employee's families by employers with dental plans.

More than half of the survey responses reported life insurance benefits. Dependent life insurance coverage was minimal at 15%.

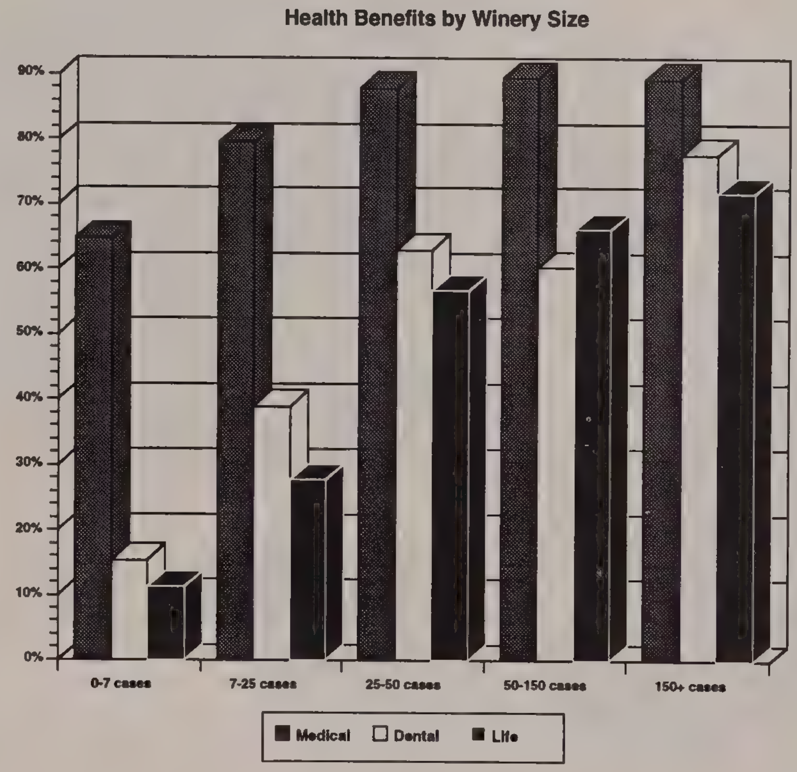
It should be noted that dependent coverage for all classes of insurance was not uniformly paid for entirely by the employer. In the most common arrangement, the employee pays the additional premium for dependent coverage.

In the previous survey, a majority of respondents from wineries producing over 50,000 cases/year had retirement or profit-sharing plans. These plans were not as common in smaller wineries. This survey shows that wineries over 50,000 cases/year continue to have the same level of participation. When compared to the previous survey, more wineries under 50,000 cases/year are offering retirement plans.

Paid vacations are fairly standard at two weeks. The vacation period increases after three to five years of employment.

Educational benefits, such as paid attendance to seminars or paid membership in professional organizations, are gaining popularity.

Some of the larger wineries reported they allow employees to allocate their benefit dollars as they choose through 'cafeteria' plans. Other wineries offer paid child care expenses.


Health Benefits by Winery Size

Conclusion

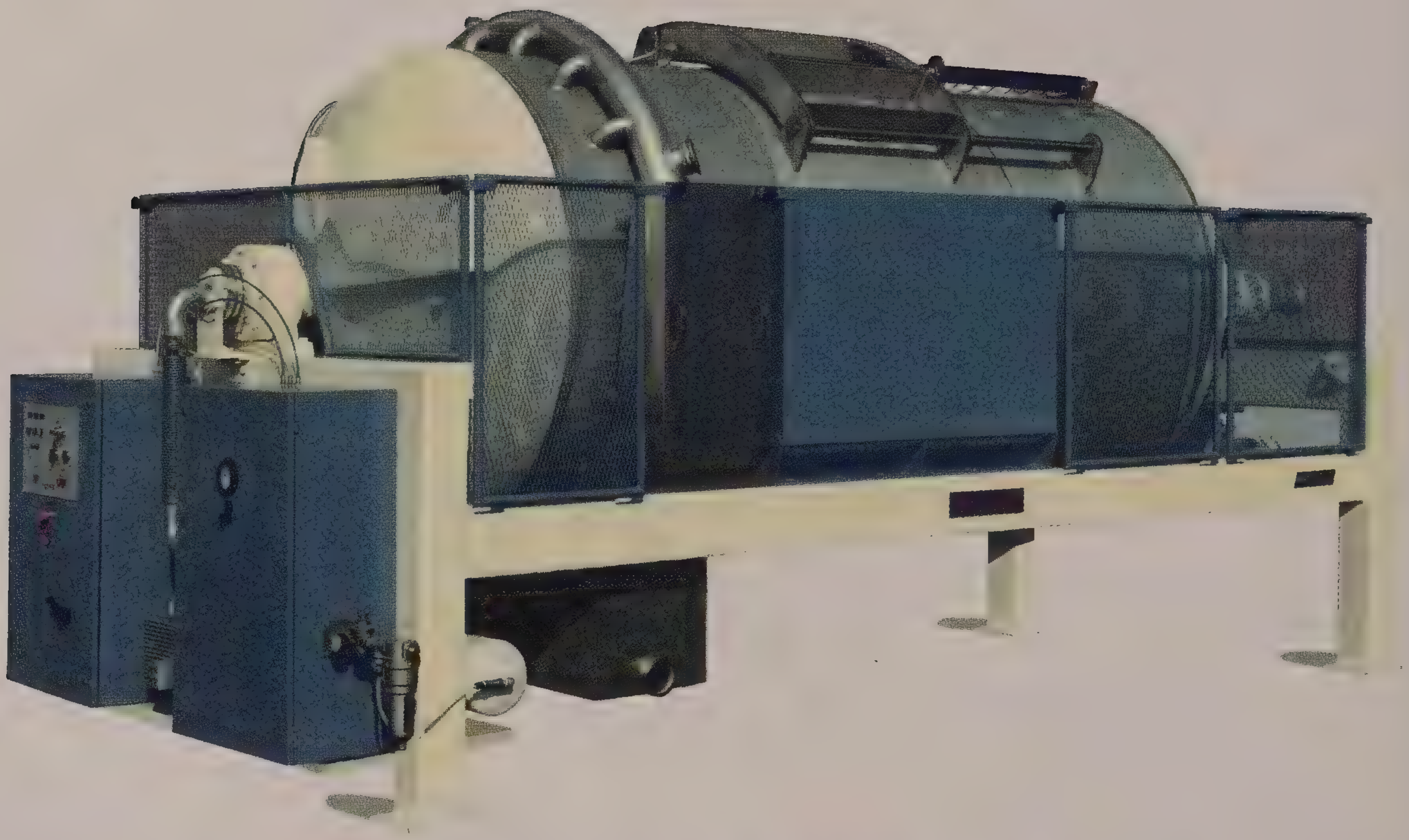
The current tough economic times were reflected in the comments, particularly from smaller wineries. Many expressed a strong desire to expand employee benefits (or provide a minimal package at the very least) but reported they are unable to do so for lack of financial ability. Everyone seems to be 'holding tight' to ride out the rough seas.

One definite trend was clear in the previous survey and continues here: With the exception of winemakers, in most cases larger wineries offer greater pay increases for major positions than smaller wineries.

Overall, the general manager position showed smaller increases than two years ago, while winemaker salaries showed a slightly stronger percentage increase in this survey. Other cellar positions had increases that essentially kept pace with inflation. Surprisingly, the cellarmaster position showed an average decrease from the previous survey. However, this abnormality may be due to a few respondents who reported newly hired cellarmasters at rates significantly below previous levels.

Following are responses by job title, winery capacity, and salary bracket. Also included are the average and median salaries for each category. The median is the level where half of the total responses are below that value, and half are above. ■

PEAK.



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$ PWV $alary SURVEY

➤ WINEMAKER

Winery capacity: under 7,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$16,000 - $24,999
5	$25,000 - $29,999
5	$30,000 - $39,999
4	$40,000 - $50,000

Average=$29,994 Median=$30,000

Winery capacity: 7,000 - 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
9	$12,000 - $29,999
8	$30,000 - $39,999
14	$40,000 - $47,999
16	$48,000 - $59,999
4	$60,000 - $65,000

Average=$44,520 Median=$42,000

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
7	$26,000 - $39,999
8	$40,000 - $49,999
12	$50,000 - $59,999
8	$60,000 - $72,000

Average=$51,080 Median=$50,000

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$36,000 - $49,999
10	$50,000 - $59,999
5	$60,000 - $79,999
4	$80,000 - $89,999
4	$90,000 - $120,000

Average=$66,705 Median=$59,098

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$45,000 - $54,999
4	$55,000 - $69,999
7	$70,000 - $79,999
3	$80,000 - $105,000

Average=$68,647 Median=$72,625

➤ ASSISTANT WINEMAKER

Winery capacity: under 7,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$12,000 - $29,999
3	$30,000 - $32,000

Average=$24,517 Median=$28,000

Winery capacity: 7,000 - 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
5	$12,000 - $24,999
7	$25,000 - $35,999
2	$36,000 - $45,000

Average=$27,887 Median=$30,000

Winery capacity; 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
9	$16,000 - $29,999
7	$30,000 - $37,999
6	$38,000 - $54,000

Average=$32,557 Median=$38,570

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
6	$28,000 - $38,999
6	$39,000 - $42,999
8	$43,000 - $60,000

Average=$40,692 Median=$38,570

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
2	$28,000 - $39,999
10	$40,000 - $52,000

Average=$42,522 Median=$43,656

➤ ENOLOGIST

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
2	$19,000 - $24,999
3	$25,000 - $34,999

Average=$30,007 Median=$29,500

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
6	$28,000 - $29,999
8	$30,000 - $38,000

Average=$31,414 Median=$31,542

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$23,000 - $29,999
5	$30,000 - $39,999
2	$40,000 - $53,000

Average=$32,891 Median=$31,000

➤ CELLAR MASTER

Winery capacity: 7,000 - 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
9	$15,000 - $21,999
8	$22,000 - $29,999
3	$30,000 - $50,000

Average=$25,528 Median=$25,000

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$12,000 - $19,999
12	$20,000 - $29,999
7	$30,000 - $34,999
3	$35,000 - $62,000

Average=$28,664 Median=$25,750

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$19,000 - $29,999
12	$30,000 - $39,999
2	$40,000 - $50,000

Average=$33,921 Median=$35,500

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
5	$25,000 - $34,999
8	$35,000 - $52,000

Average=$36,952 Median=$38,900

➤ CELLAR WORKER

Winery capacity: 7,000- 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
6	$ 15,000 - $19,999

Average=$18,454 Median=$17,000

Winery capacity: 7,000 - 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
9	$10,000 - $14,999
8	$15,000 - $19,999
9	$20,000 - $24,000

Average=$17,228 Median=$17,000

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
8	$12,500 - $17,999
13	$18,000 - $24,999
5	$25,000 - $38,000

Average=$20,548 Median=$20,000

Winery Capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
7	$16,000 - $21,999
6	$22,000 - $25,999
8	$26,000 - $35,000

Average=$23,303 Median=$24,535

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
6	$16,000 - $22,999
5	$23,000 - $29,999
3	$30,000 - $35,000

Average=$24,630 Median=$23,865

➤ VINEYARD MANAGER

Winery capacity: under 7,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$15,000 - $24,999
5	$25,000 - $40,000

Average=26,698 Median=$25,240

Winery capacity: 7,000 - 25,000 cases/year

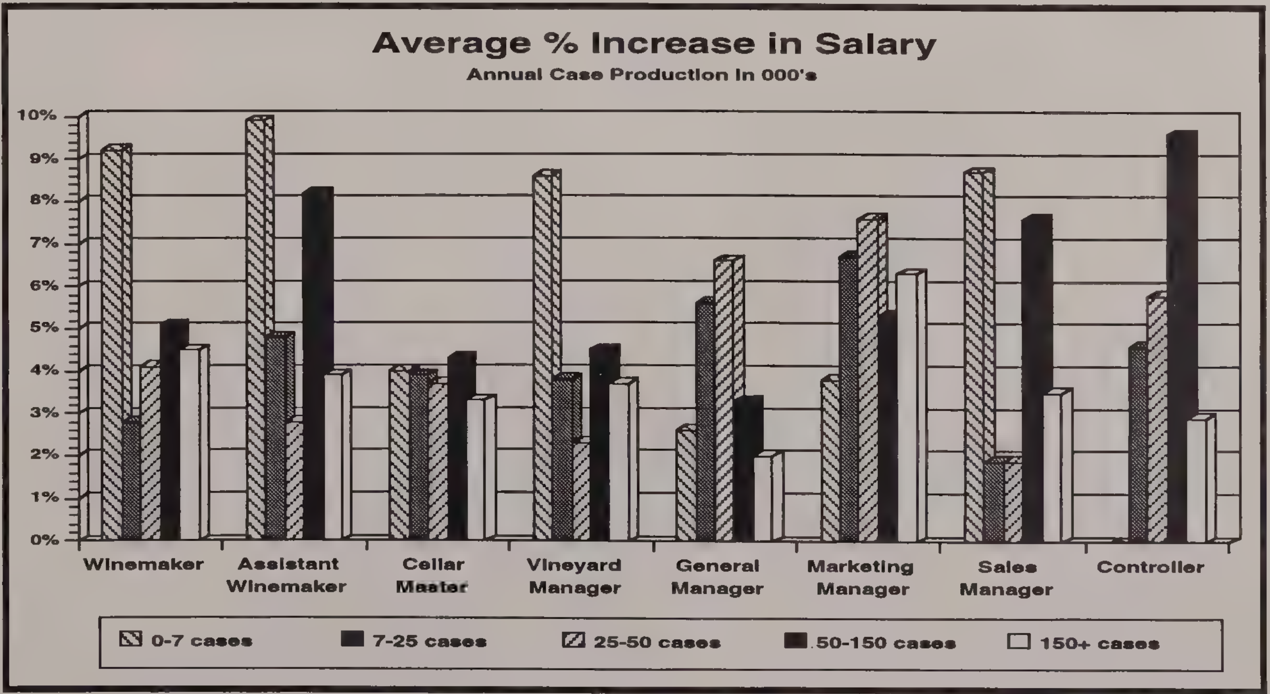
REPLIES	ANNUAL SALARY RANGE
9	$12,000 - $22,999
9	$23,000 - $29,999
6	$30,000 - $36,999
4	$37,000 - $57,000

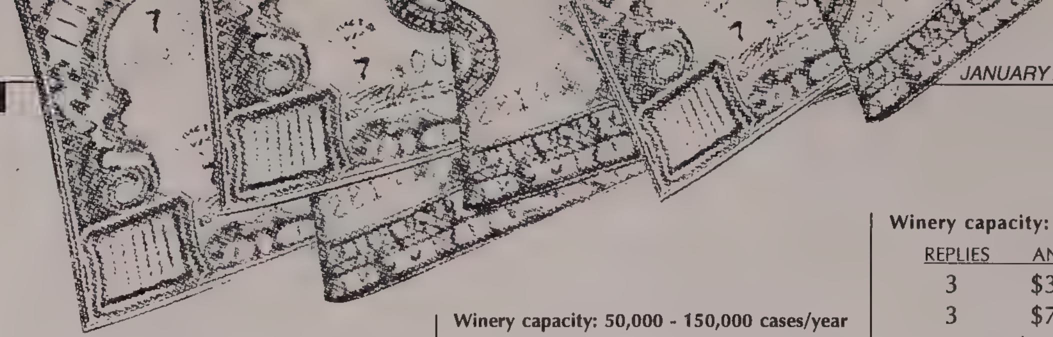
Average=$27,688 Median=$25,000

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
2	$12,000 - $24,999
8	$25,000 - $39,999
5	$40,000 - $49,999
3	$50,000 - $57,000

Average=$37,581 Median=$35,000





PWV $alary SURVEY

Vineyard Manager (continued)

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$27,000 - $34,999
3	$35,000 - $50,999
4	$51,000 - $75,000

Average=$50,215 Median=$46,750

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$42,000 - $47,999
4	$48,000 - $59,999
3	$60,000 - $75,000

Average=$52,986 Median=$51,000

➤ GENERAL MANAGER

Winery capacity: under 7,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$15,000 - $29,999
5	$30,000 - $39,999
2	$40,000 - $49,999
2	$50,000 - $95,000

Average=$38,929 Median=$30,000

Winery capacity: 7,000 - 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
7	$18,000 - $34,999
7	$35,000 - $49,999
8	$50,000 - $69,999
8	$70,000 - $125,000

Average=$56,816 Median=$53,600

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$35,000 - $49,999
6	$50,000 - $69,999
12	$70,000 - $89,999
5	$90,000 - $110,000

Average=$76,680 Median=$76,500

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$36,000 - $44,999
5	$45,000 - $69,999
5	$70,000 - $89,999
4	$90,000 - $130,000

Average=$72,662 Median=$72,000

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
2	$58,000 - $89,999
5	$90,000 - $124,999
3	$125,000 - $150,000

Average=$104,995 Median=$110,600

➤ MARKETING MANAGER

Winery capacity: 7,000 - 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
6	$20,000 - $35,999
6	$36,000 - $54,999
3	$55,000 - $88,000

Average=$42,000 Median=$43,563

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$24,000 - $35,999
3	$36,000 - $54,999
4	$55,000 - $69,999
3	$70,000 - $85,000

Average=$53,572 Median=$54,938

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$42,000 - $56,999
3	$57,000 - $79,999
4	$80,000 - $120,000

Average=$70,180 Median=$62,000

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$33,000 - $69,999
2	$70,000 - $84,999
4	$85,000 - $120,000

Average=$78,418 Median=$78,000

➤ SALES MANAGER

Winery capacity: under 7,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$12,500 - $19,999
3	$20,000 - $30,000

Average=$20,571 Median=$18,000

Winery capacity: 7,000 - 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$12,000 - $27,999
5	$28,000 - $45,000
5	$55,000 - $100,000

Average=$45,083 Median=$35,500

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
5	$30,000 - $42,999
5	$43,000 - $59,999
3	$60,000 - $95,000

Average=$49,713 Median=$47,063

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$42,000 - $51,999
5	$52,000 - $120,000

Average=$64,787 Median=$60,000

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$33,000 - $69,999
3	$70,000 - $114,999
3	$115,000 - $165,000

Average=$94,727 Median=$90,000

➤ REGIONAL SALES MANAGER

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
2	$29,000 - $35,999
4	$36,000 - $59,999

Average=$46,929 Median=$46,500

Winery capacity: 50,000 - 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$48,000 - $54,999
3	$55,000 - $90,000

Average=$59,058 Median=$53,500

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
4	$52,000 - $64,999
4	$65,000 - $85,000

Average=$62,526 Median=$63,000

➤ CFO/CONTROLLER

Winery capacity: 7,000 - 25,000 cases/year

REPLIES	ANNUAL SALARY RANGE
5	$12,000 - $27,999
3	$28,000 - $39,999
4	$40,000 - $49,999
2	$50,000 - $85,000

Average=$36,857 Median=$35,500

Winery capacity: 25,000 - 50,000 cases/year

REPLIES	ANNUAL SALARY RANGE
5	$23,000 - $31,999
5	$32,000 - $54,999
5	$55,000 - $80,000

Average=$45,638 Median=$40,475

Winery Capacity: 50,000 - 150,000 cases/year

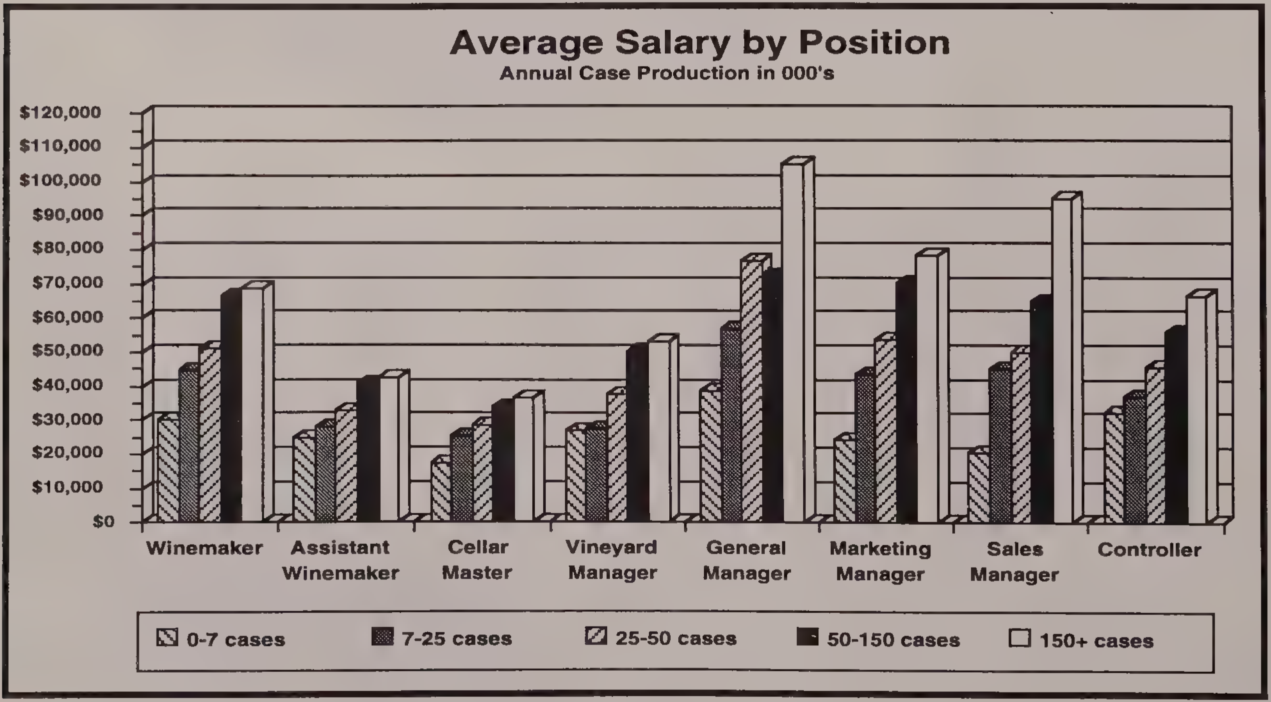
REPLIES	ANNUAL SALARY RANGE
3	$25,000 - $39,999
4	$40,000 - $49,999
5	$50,000 - $64,999
4	$65,000 - $85,000

Average=$55,795 Median=$59,880

Winery capacity: over 150,000 cases/year

REPLIES	ANNUAL SALARY RANGE
3	$33,000 - $51,999
3	$52,000 - $76,999
3	$77,000 - $100,000

Average=$66,494 Median=$67,000



Salary Survey reprints are available by calling *PWV* 415/479-5819.

Understanding the safety compliance maze

**By Carol Morrill,
The Personnel Perspective**

Wineries must work hard to meet increasingly complex safety regulations to insure legal compliance and reduce liability today. In order to comply with these regulations, wineries must develop safety programs for injury and illness prevention, hazard communication, emergency response, confined spaces, respiratory protection, hearing conservation, and chemical hygiene.

Not only will wineries who develop these programs benefit from complying with occupational, safety, and health regulations, they will discover that well-written safety programs reduce the chance of employee injuries, heighten employee awareness of the importance of safety, insure communication about safety rules and expectations, and can help prevent or eliminate unnecessary worker's compensation expenses and lost employee work time.

The basic requirements of each of these programs are outlined below, and because in most cases, California regulations are more stringent than other state, or even federal regulations, these recommendations nearly all address complying with California law.

Unlike the other programs, the **Injury and Illness Prevention Plan** (IIPP), which became law with the passage of California Senate Bill-198 in 1991, is only mandatory for California businesses. However, it is recommended that all wineries (nationwide) have a written injury and illness prevention program. It is the most important plan because it covers all aspects of safety.

The IIPP has several components. It is essential that your IIPP include: 1) one person who has authorization and responsibility for implementing your plan; 2) the company safety policy; and 3) the methods of communicating your IIPP, which include periodic inspections, injury and illness investigations, correction of unsafe or unhealthy conditions, training, recordkeeping, and employee compliance.

Documentation is critical for this plan to be effective. Proper documentation will include the development and retention of certain forms included in the program. Your safety officer should be monitoring and maintaining required safety information and documenting the following with the appropriate forms: safety inspections, safety meetings, different types of training being performed, disciplinary action, safety equipment inspections and checklists, request for safety projects, employees' report of unsafe condition or hazard, and supervisor's accident investigation.

The IIPP also must include an **Emergency Response Plan** with evacuation routes, procedures, and training in the event of an emergency. It must also include recovery procedures, checklists, and periodic inspections and drills.

The **Hazard Communication Plan** complements the IIPP. It provides more detail on hazardous materials, the safe and proper handling of chemicals, and material safety data sheets (MSDS). It also includes details on personal protective clothing as well as compliance with various safety signage rules.

Somewhat new to winery compliance is a revised **Confined Space Plan**. Tank entry procedures should be a major component of this plan. Under the law, you must identify all confined spaces in your plan. The plan must include a frequently updated list of individuals who have been trained and officially authorized by the winery to enter tanks. A method of continuous monitoring and documenting of the oxygen level inside tanks must be established before, during, and after entry into a tank. A warning mechanism must be in place to alert employees when oxygen levels drop to a dangerous limit.

Another mandatory written plan is the **Respiratory Protection Plan**. This plan outlines winery methods and procedures to protect employees from any respiratory illness. On-going training includes an annual fit-test along with respirator demonstrations. These are extremely important for new employees. Finally, respirators must be kept clean and dry in an enclosed place and readily available for Occupational Safety and Health Administration (OSHA) inspections.

If hearing protection is necessary in any department of your winery, there must be a **Hearing Conservation Plan**. Training must be given along with annual baseline hearing tests. Outside resources can assist in measuring noise levels within the winery.

The **Chemical Hygiene Plan** (CHP) applies to any business having a laboratory. This is a separate safety plan for laboratories only. It addresses how to prepare for laboratory accidents and implements methods to prevent them. Some laboratories may require a more elaborate plan, depending upon their function within the winery. The CHP has changed the safety requirements for laboratories, and if you do not have a plan currently in place, it should be an immediate priority. A safety consultant can work with the lab employees to develop and implement this plan as required by law.

There are several programs or trainings which are highly recommended as part of any safety program. Training for *Back Injury Prevention* should be conducted because material handling is the most frequent cause of injuries in wineries. Proper *Ladder Safety* techniques insure employee awareness of the hazards which can occur when using a ladder. Any employee with responsibilities for driving a forklift must attend and satisfactorily complete *Forklift Training* conducted by an official trainer.

Training in *propane, fire extinguishers,* and *electrical safety* can be the difference between a major catastrophe or routine safety procedures. Finally, you would be wise to have one or more employees certified in *cardio-pulmonary resuscitation (CPR)* and first aid.

There is a new plan called **Blood-borne Pathogens in the Workplace**. It is designed specifically for high-risk industries such as medical laboratories or hospitals, but it is highly recommended for all businesses, including wineries. The winery training for this plan provides methods to protect workers from contact with bodily fluids of other workers when assisting with an injury and helping to stop the flow of blood. There are certain types of first aid supplies which must be available to use for this protection.

The last plan is the **Drug-Free Workplace Act** (DWA). If you do have contracts with federal government agencies, you must comply with the DWA. Employees must be aware that use of any kind of drugs on the job will not be toler-

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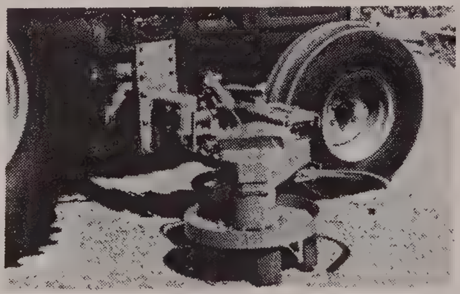

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ated, whether it be selling, using, or distributing them.

One aspect which is easily overlooked, but critical, in any safety program, is thorough training of new hires. Even if these workers are hired for only a week, they should never be put on the job if they have not been given proper training. Why? The reason is simple. These workers could be injured the first day on the job. In fact, lack of experience and knowledge is one of the major reasons workers get injured. Of course, training cannot guarantee an injury-free workplace, but it is imperative in the prevention of accidents.

Thorough safety training should be part of the new employee orientation process. Take these employees on a tour of the winery and note essential safety areas, including first aid stations, eye wash and shower stations, material safety data sheet location, personal protective equipment, and fire extinguisher locations, for example. Have them sign documentation which shows that you provided and discussed safety information. This documentation must be dated with a copy retained as part of the employee's personnel file.

Training must be continuous and include new laws, revisions to existing laws, and training employees who move to new areas of responsibility.

What to do?

Despite your best efforts, complying with this regulatory maze can be overwhelming and time-consuming. Explore these three options to comply with existing laws and to make safety work for you:

1) *Hire a Safety Compliance Officer.* This option ensures a staff person has 100% responsibility for continuously monitoring safety programs and practices. The problem with this option is that most wineries cannot justify the overhead expense of another employee. Also, this function may not require full-time employment. Additionally, having a specialist on staff would probably be costly.

2) *Train a current employee to serve as your Safety Compliance Officer.* This allows you to enhance an existing employee's position by adding responsibilities. However, too often, employees are too busy juggling their current work responsibilities to devote the time required to meet OSHA compliance standards. Also, proper training of an employee is a long, expensive process requiring time away from the job to attend numerous classes and seminars.

3) *Outsource this function to an outside organization specializing in safety compliance.* Outsourcing is becoming a popular and accepted practice in many areas of business. It means you contract outside services to address the mandatory requirements at a level which conforms to your budget. It allows you to focus on what you do best and let the outsource organization provide the service you really don't have time for but are required to do. This option can also be cost-effective because you eliminate payroll and personnel costs.

A good test as to whether outsourcing the safety function is right for your winery is to ask yourself if you can devote the management time and resources to insure compliance with the mandatory safety programs required by law. If you cannot, set up a partnership with a safety professional who can support you in accomplishing this on an on-going basis. ■

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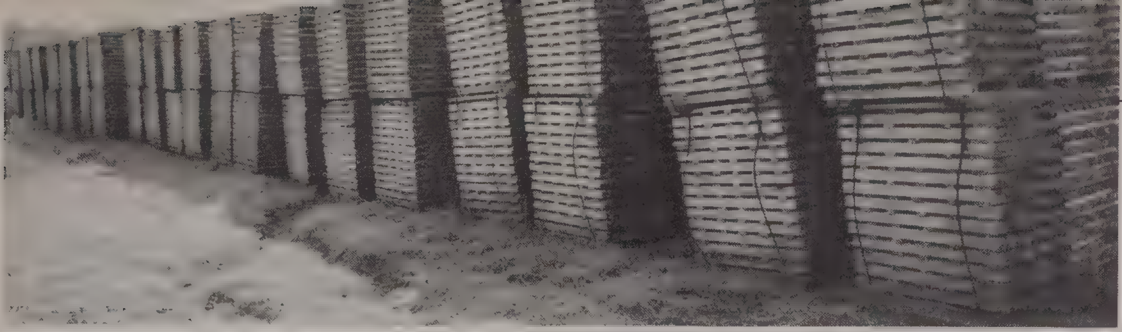

Skids of American oak stavewood air-drying in Missouri for Tonnellerie Francaise.

'French-style' American oak *wave* of the future?

By Carole Taines

Until quite recently, the attitude toward American oak held by many California winemakers, with very few exceptions, was one of skepticism if not outright rejection. This attitude was based on many things:

1) The satisfactory track record of French oak use in California winemaking.

2) The assumption, often correct, that the use of French oak lent an exotic mystique to California wines that could be capitalized on with the consuming public.

3) The fact that, until the early 1980's, American oak used in the wine industry was not coopered to winemaking specifications, and therefore often gave unsatisfactory results, and

4) Simple prejudice, because few winemakers had actually set up controlled, repetitive, blind-tasted experiments comparing the sensory characteristics of wines aged in American versus French oak.

The few California winemakers that introduced American oak into their winemaking programs before the late 1980s used it for intense, hearty red varietals such as Cabernet Sauvignon or Zinfandel because these varietals could stand up to, and often blend quite well with, the aggressive aromas and flavors that the American oak available at the time contributed.

Most winemakers found the dominant flavors of American oak to be much too overwhelming for the delicacy of their white wines, although a few wineries found a niche in the marketplace for American oak aged Chardonnays.

The factors that caused these sensory characteristics, often described as 'forward' and 'vegetative' were to some degree, directly related to how the American oak was coopered, *i.e.,* 1) The manner in which the wood was dried before being made into staves; 2) How the staves were bent; and 3) How the interior of the assembled barrels were toasted (if, indeed, they were toasted at all). Many of these ideas will be discussed in the following interviews with various California winemakers.

These observations led to a good deal of research (starting in 1980) by coopers using American oak to find ways to modify the characteristics of their product to make it a welcome component of California winemaking. Would American oak, if coopered similarly to French oak, be acceptable to California winemakers? After all, some research showed that winemakers were much more able to recognize toast level than oak type (Jekel Vineyards work with Innerstave, 1980s).

Simultaneously, the increasing cost of French oak, coupled with shrinking budgets of many wineries, has caused California winemakers to take another look at American oak. Fortunately for the wine industry, American oak coopers are ready for them.

Important contributions to the recent improvements in American oak include fire-bending staves, using wood fires to toast, and making barrel dimensions match those of French oak barrels, so they stack better on pallets.

Joel Aiken, Beaulieu Vineyard

Rutherford, CA

Andre Tchelistcheff introduced American oak to Beaulieu Vineyard (BV) about 1939. There was a period of time, due to war, when French oak was not available and American oak has been used almost exclusively since that time with their Cabernet Sauvignon.

American oak was also used in the BV Pinot Noir program. But French oak was implemented in the mid 1980s because they found American oak overwhelmed the relatively light color and light tannin fruit that was the source of their Pinot Noir.

BV has been experimenting with American oak with Chardonnay since 1987, and in 1991, ordered barrels from many different coopers. When asked to describe the sensory differences between American and French oak, Joel Aiken responded, "American is more intense, powerful and more aromatic, with more vanillin and spicy notes than French oak.

"Until the mid 1980s, we used American oak barrels that were uncharred whiskey barrels made of kiln-dried wood with steam-bent staves." It appears that artificial drying of wood with high temperature, (such as occurs in kiln drying), destroys enzymes in the wood and the microorganisms that act on wood components. This makes it impossible for certain positive chemical reactions to occur (lignins evolving into aromatic compounds, for example) that are a result of long, natural drying in the air. Furthermore, harsh tannins and impurities remain that would have been washed away by rainwater had the wood been dried in the open.

Steam bending has been shown to limit chemical transformations which occur in fire-bent staves, such as the development of vanillin-flavored compounds (Rene Naudin, 1990). Untoasted barrels contribute a 'raw' wood component to wines, giving them a sawdust aroma and a bitter, astringent flavor.

In 1981, Aiken completed his Masters thesis at UC Davis on the sensory differences between American and French oak aged Cabernet Sauvignon. The American oak was air-dried and toasted. The tasting panel could not significantly distinguish between the American and French oak aged wines.

In 1986, BV requested toasted barrels. The toasting was done by gas fire, which was too quick but "better than none," recalls Aiken. In 1988, the coopers were asked to do a long, slow toasting over an oak fire, and BV preferred the results.

In 1989, they used wood that had been air-dried one year and the staves were bent with dry heat. Since then, BV has insisted that the barrels undergo a long (about 40 minutes), slow deep toasting that fully penetrates the wood. BV generally requests medium toast, with some medium plus.

BV is on a 10-year rotation with American oak barrels, and purchases about 10% new barrels annually. In contrast, they are on a five-year rotation with French oak.

They have found that American oak barrels have a much longer extractive life than French oak. This was shown by research done by Craig Rous (Robert Mondavi Winery, Woodbridge, CA) in 1985, which showed almost a 50% reduction in nonflavonoid phenolics between the first and second fills of a French oak barrel, but only about a 30% reduction between the first and second fills of an American oak barrel.

It is possible that this result is related to the greater density and lesser permeability of American oak barrels (Singleton, 1955), a factor that theoretically should make it possible to top them less often and, as will be seen below, allows American oak to be quartersawn.

"BV buys from almost every cooper," reports Aiken, "but most barrels come from Independent Stave." In the past, with the typical whiskey barrel, a warm soda ash solution was used to prep the barrels. The barrels would soak overnight, be rinsed with a citric/water solution and then filled with wine.

Now, with the superior French-style American oak barrels available, BV is experimenting with less soda ash and will probably eliminate it altogether: just soak with water, rinse, and fill. BV does not shave American oak barrels. An experiment was done in the late 1980s with shaving and toasting, but the results were unacceptable.

BV's future plans with American oak include: using 'chateau-style' barrels with thinner staves so the wine will soften more quickly ("Maturity is retarded with American oak barrels due to their density, which limits reaction with oxygen," says Aiken); gradually incorporating more American oak into the Chardonnay program, maybe up to 5% to 10%, using medium plus toast barrels; and maybe experimenting again with American oak on Pinot Noir, now that they are working with more intensely pigmented and tannic clones and going to barrel 'dirtier' (instead of filtering first).

BV will also be focusing on choosing wood according to tightness of grain, rather than specific geographical areas of origin.

Dennis Martin, Fetzer Vineyards

Redwood Valley, CA

Fetzer Vineyards has used American oak barrels since 1968. American oak was used exclusively for reds until about 1985, when French oak was introduced for the small volume, 'high end' wines. About four years ago, they began using American oak in their Chardonnay program (anywhere from 5% to 15%).

In 1990, they started barrel-ageing Sauvignon Blanc, at first using only French oak, then adding American oak to the barrel mix. In 1992, they started barrel-fermenting a portion of the Sauvignon blanc in both French and American oak barrels.

Winemaker Dennis Martin thinks the 'quality gap' between French and American oak barrels has narrowed tremendously over time, mainly due to the use of air-dried wood, and wood (rather than gas-fired) toasting.

"Comparing the short, 10- to 15-minute gas-fired barrels with long, slow wood-toasted is like comparing apples and oranges," says Martin. He feels this method has resulted in the flavors of American oak barrels being much less aggressive, much less 'green wood and dill,' to the extent that it is often difficult now to tell French from American oak when the wines are tasted blind.

Fetzer orders medium to medium plus toasted barrels that are toasted long and slow, so that the fire penetrates deep into the wood. Light toasting has not been tried. Martin feels that heavy toasting results in flavors that are 'too smoky and bacony.'

The approximate Fetzer breakdown on American oak barrels to wine type is: 'high end' Cabernet Sauvignon about 25%, 100% for all other Cabernet Sauvignon; 100% for Zinfandel; 100% for Merlot; about 30% for white wines. The two primary coopers used are Independent Stave, and Blue Grass. Canton Cooperage, Tonnellerie Francaise (Missouri and Oregon sources), Tonnellerie Radoux, A&K, and Seguin Moreau are being evaluated on an experimental basis.

After about two years, American oak barrels are switched to the red wine program. After five years in the red program, they're reconditioned by shaving, firing, and flipping or replacing with new heads.

Fetzer's future plans with American oak include: looking at wood from different geographical locations; barrel-fermenting more Sauvignon blanc; experimenting with American oak in both their new organically grown Chardonnay and other 'high end' wines. Fetzer is starting their own barrel making operation, Mendocino Cooperage, with master cooper Keith Roberts. They are using two-year air-dried Minnesota wood, for both in-house use and sale, crafted in the traditional 225L premium style.

Greg Upton, Franciscan Vineyards

Rutherford, CA

American oak has been used at Franciscan Vineyards since 1986. Originally, it was only used with Cabernet Sauvignon; now it is used for Merlot (30%), Zinfandel (100%), the Estancia Chardonnay (40%, barrel-fermented), Sauvignon blanc (50%, only barrel-aged), and the white Meritage (50%, barrel-fermented). At present, the Franciscan Cabernet Sauvignon is 40% American oak, and the Estancia Alexander Valley Cabernet Sauvignon is 100% American oak.

Winemaker Greg Upton finds a more intense vanilla character in American oak than French oak. He also feels that American oak adds a spiciness to reds that brightens the fruit. "It is not as caramel or toffee-like as French oak," says Upton, "but can have a more dominating oak flavor than French oak.

"Now that coopers are refining their techniques, particularly concerning toast method and level, there is much less of the resinous character we saw in the past and the differences between the two sources of oak is definitely narrowing."

Upton prefers heavy toast, which reduces the aggressive oak character. He wants the barrels neither raw nor charred, just 'toned down.' He has not done enough trials to state definitely that air-drying is a critical quality factor. Most of Franciscan's past experience has been with American oak from a warmer growing area, such as the Ozarks. Upton is tending toward wood from colder, northern areas (Wisconsin, Minnesota), where growth is slower and the grain is tighter.

The Franciscan Vineyards barrel breakdown is approximately 65% American and 35% French oak. Upton would like to see the American percentage increase; most of the Estancia is already entirely American oak. Coopers used are: Independent Stave, Barrel Builders, Demptos, and Tonnellerie Francaise. New barrels are cold water rinsed, drained, and filled with wine.

"We almost never have leaks with American oak barrels," says Upton. Franciscan doesn't shave barrels because they find the resulting flavors too cooked and/or smoky.

Future Franciscan plans include: barrels coopered from Oregon oak and using different types of woods, such as hickory, for the toasting fire. "Theoretically, if we continue to see the type of improvement that we've seen in recent years, we could go 100% with American oak," suggests Upton.

Jeff Meyers, Montevina

Plymouth, CA

Montevina has been using American oak since 1973. Originally, the decision was dictated by price and they accepted the less than optimum character imparted by American oak barrels, as they were coopered at that time. Now, since the quality has improved so dramatically, it's a decision based on esthetics and price!

Montevina production is approximately 60% red and 40% white. They use American oak with all reds (Zinfandel, Barbera, and Cabernet Sauvignon). They are also starting to work with some Italian varieties (Sangiovese), and will experiment with American oak. American oak was tried with in the past in the Chardonnay program, but it was not preferred because it contributed a vegetative character to the wine.

Jeff Meyers thinks the sensory differences between American and French oak are dependent on whether the American oak is air-dried, fire-bent, and properly toasted.

"Air-drying leaches out the dill character," says Meyers, "as does fire-bending and medium to medium plus toasting. Light toasting does not reduce the dill character sufficiently, and heavy toasting results in bacon flavors."

Before French-style American oak was available, Montevina used to soft-pedal the American oak component, especially keeping the percentage of new oak low. Now, they use about twice as much American as French oak. They purchase barrels from Independent Stave, Tonnellerie Francaise, and Demptos.

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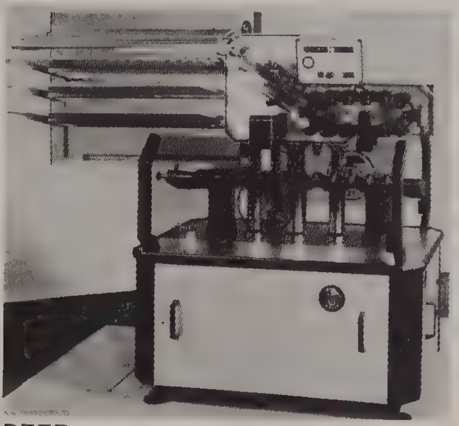
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with cold water, checking for leaks, dumping and filling with wine. In the past, they tried a more intensive prep method using soda ash to reduce the dill, but "it never came to much," recalls Meyers.

Future Montevina plans include: American oak with their new Italian varietal program, and incorporating small percentages of American oak in the Chardonnay, and trying Oregon oak. Meyers doesn't think certain varieties are more suited to French oak than American oak. "The test is barrel-fermented Chardonnay, which many people are doing quite successfully in French-style American oak now," says Meyers. "If that's working, you ought to be able to do anything in American oak."

Paul Draper, Ridge Vineyards

Cupertino, CA

American oak has been used at Ridge Vineyards since the 1960s. Paul Draper read a University of Bordeaux thesis, based on experiments with the 1900 vintage, in which Chateau Haut Brion, Latour, Lafitte, and Margaux participated. Their wines were in French, Baltic, and American oak, then analyzed and blind-tasted first in barrel and then in bottle annually for 10 years. The American oak-aged wine was preferred to the French across all four Chateaux.

This is not so surprising when one considers that, according to Gerald Asher (***Gourmet*** Magazine, 1988) the Bordelais didn't use French oak for their finer wines until the mid-19th century, when they could no longer get Baltic oak due to wars in Europe and had to use local wood that the English, their primary customers, didn't like!

Draper had no desire to produce an imitation Bordeaux at Ridge, and was convinced of the potential quality of red wines aged in American oak. Therefore, he built the Ridge reputation on American oak, and only small percentages of French oak have been used over the years. There is one small quantity of Chardonnay which has traditionally been barrel-fermented and aged in French oak, but Draper is starting to experiment with American oak for this wine as well.

Ridge originally used Arkansas wood, air-dried for several years and toasted to specifications, usually medium toast. This was in the early 1970s, so Draper is now interested in choosing wood from more northern areas, such as Minnesota. Ridge has worked with the following coopers: Blue Grass, Independent Stave, McGuinness, Barrel Associates, and others.

"Air-drying with its natural cycle of wetting and drying the staves and toast level are critical to the quality of American oak," says Draper. "If the wood is not properly air-dried, which involves natural leaching and a build-up of microflora in the wood, you get green flavors." When medium toast is used for both air-dried American and French oak, Draper finds it hard to consistently tell the difference. With heavy toast, however, Draper feels American is sweeter than French.

Draper cites air-drying and wood-fire toasting as the most important elements in improving the quality of American oak.

The issue of quarter-sawn versus split wood is not a quality factor. "French coopers would love to quarter-saw," notes Draper, "but they can't because the French oak species have a different tyloses configuration than the American species, and more tendency to leak. That's why French oak has to be split!" (Tyloses are plugs in the cell wall which form in the heartwood and prevent liquid penetration.)

The Ridge purchase ratio of American to French oak barrels is about 10 to 1. Ridge preps new barrels by filling with about three gallons of 180°F water, followed by splashing and turning (a figure-eight roll). The hot water is not allowed to cool in the barrel. After draining, the barrels are rinsed several times with cold water. They don't shave their older barrels in an attempt to renew them, after discovering through experiments that shaved untoasted barrels gave a dry-shingle taste, and shaved toasted barrels a cooked taste .

Future plans at Ridge include more experimentation with American oak and Chardonnay, American oak from different geographic areas, and HPLC/GC analysis of phenolics from different oak types and oak toasted to different levels.

Carol Shelton, Klein Family Vintners

Windsor, CA

Klein Family Vintners (KFV) has been using American oak since 1981 and perhaps longer. It was originally used with red wine, and has been used in the Chardonnay and Sauvignon blanc programs as well. KFV began toasting its own barrels (both new and newly shaved) in 1984, and that made a giant leap forward in quality.

Winemaker Carol Shelton has found the quality differences narrowing between American and French oak. The French oak contributes a "more creamy, sweet and subtle" flavor, whereas American oak is more easily recognizable as oak, and can be over-extracted and harsh on the palate if toasting is not done properly.

KFV uses medium plus toast for white wines (Chardonnay and Sauvignon blanc) and heavy plus toast for reds. New barrel purchase ratio is roughly 60% American, 40% French. KFV buys almost all their American oak barrels from Blue Grass and Independent Stave.

New barrels are filled with five to ten gallons of water and rolled around to wet the entire inside surface. The barrel stands on one head four to five hours or overnight and is checked for leaks. The barrel is then flipped to stand on the other head for four to five hours or overnight and again checked for leaks. The barrel is drained, rinsed with hot water for one minute, and drained before filling with wine. The barrels are shaved and retoasted after about five to six years.

Current American oak experimentation includes working with 'corrugated' (grooved) barrels; hickory wood for toasting fires; comparing French and American shaved and toasted by KFV, and American oak from different geographical areas. Freshly shaved barrels are allowed to air-dry several days to one week before toasting.

Mark Lyon, Sebastiani Vineyards

Sonoma, CA

Sebastiani has used American oak since the late 1960s. Old 'whiskey barrels' were originally used for the Proprietor's Reserve reds, such as Cabernet Sauvignon, Zinfandel, and Barbera. New American oak was incorporated into the 'finer wines' in the mid 1970s in order to 'jazz' up the flavors. By 1980, American oak was included in the regular Sonoma County bottlings of Cabernet Sauvignon and Zinfandel.

In 1990, Sebastiani started barrel-fermenting a portion of the Sonoma Chardonnay in American oak. Winemaker, Mark Lyon has found that there is better wood integration with American oak if barrel fermentation, malolactic fermentation, and sur lies ageing occur as well.

Lyon describes the sensory differences

between American oak and French oak: American oak tends to contribute more oak 'punch,' more wood flavor, and more astringency. French oak tends to be more subtle, with more vanillin character and less astringency. These differences can be minimized if the American oak is sufficiently (at least two years) air-dried and open fire-toasted, which reduces the resinous sappy character and increases the vanillin and the perceived sweetness. This is particularly important with Chardonnay, which picks up any harsh or green character present in the wood. Sebastiani likes heavy toast for whites, and medium to heavy for reds.

Other improvements in American oak barrels in recent years are the switch from 53 to 59-gallon barrels, and the use of wood from colder, more northern areas where the trees grow slower and the grain is finer and tighter.

In the past, Sebastiani purchased approximately equal quantities of French and American oak, but 1993 projections were approximately six American oak for every French barrel. This shows how the premium red program is really taking off! Sebastiani has worked with Blue Grass, Canton Cooperage (whose barrels Lyon thinks are closest to French oak), Independent Stave, and A&K.

New American oak 59-gallon barrels are given a five-minute hot water rinse as prep to preserve as much new wood flavor as possible. However, new 53-gallon barrels are soaked overnight to check for leaks. American oak barrels are not shaved, but are switched out of the premium program after three to four years.

Future plans include working with 'chateau style' thin-stave American oak barrels, and experimenting with wood from different regions.

Leon Sobon, Shenandoah Vineyards

Plymouth, CA

American oak has been used at Shenandoah Vineyards since 1977. Originally it was used only with Zinfandel; now it is used in the Cabernet Sauvignon and Syrah program as well. In addition, for the last seven or eight years, they have bought 30 to 40 barrels to barrel-ferment Sauvignon blanc, which 'preps' them for use with red wine.

Leon Sobon thinks that French oak contributes more spicy notes and American oak more vanillin to the wines that are aged in them. The biggest improvements Sobon has seen, in recent years, is the production of American oak in the 'French-style:' air-drying the wood and long, slow toasting to the winemaker's specifications.

Four years ago, Shenandoah did some extensive experiments with both grain tightness and toast levels. The results indicated that fine grain with light to medium toast yielded the most preferred flavors. Light toast left too much resiny character remaining in the wood, while heavy toast gave a coarse flavor. Sobon notes that not all areas have grapes that 'match well' with American oak, and dill or weedy aromas and flavors can arise from this mismatch as well as from im-

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properly toasted wood.

Shenandoah purchases American and French oak barrels in the ratio of three to one. Coopers used are: Tonnellerie Francaise, Independent Stave, and Canton Cooperage. Canton Cooperage has been toasting heads for them by request. New barrels are prepped with a cold water overnight soak, checked for leaks, rinsed and filled with wine.

Sobon will experiment more with American oak in the future. They may try Oregon oak. They may also use American oak barrels coopered in France and compare the results with American-coopered barrels. They have begun producing a small volume of Viognier, and want to experiment and see whether French or American oak is preferred.

Robert de Leuze, ZD Winery

Napa, CA

ZD began using American oak barrels in 1969. They used it with barrel-fermented Chardonnay, and with Pinot Noir and Cabernet Sauvignon. American oak was their primary barrel source from the beginning, and always gave entirely satisfactory results.

The ZD stylistic goal with Chardonnay is to make big, rich flavorful wine and maximize the fruit. In order to achieve this, they harvest Chardonnay from regions that allow them to pick at high maturity levels and still have a good acid balance. Robert de Leuze (winemaker) finds that the American oak complements their style of Chardonnay perfectly, and brings out the tropical character of the fruit while adding vanillin, sweetness, and buttery/nutty characters.

"There's more flavor extraction over a longer period of time with French oak," says de Leuze about the difference between American and French oak. "But American oak gives a more immediate flavor contribution.

"With French oak, there is often a 'rubber' component in the light toast, which may have to do with the difficulty in getting a truly light toast barrel when the staves are fire-bent. Since we prefer light to medium toast barrels with the Chardonnay, American oak blends better. The flavor contribution from American oak is more vanillin in character."

Some heavy toast barrels are used with Cabernet Sauvignon, in addition to light and medium toast.

Dramatic progress has been made over the last few years in the quality of American oak, according to de Leuze. "American oak coopers are really listening to what winemakers want. I think the curing of staves and long, deep toasting, in the 'French style,' have made critical differences." The whiskey industry is not particularly concerned with either of these production methods.

ZD had a source of three-year air-dried wood, which was the result of a backlog. When this source ran out, and they received barrels with staves that had been cured for significantly shorter periods of time, they did not like the quality of the flavors. Experiments have begun to compare wood air-dried 12 to

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18 months, two years, and three years.

"We know there is a tremendous difference between wood air-dried 12 to 18 months and wood dried two years," says de Leuze. The younger wood shows green, pencil, 2x4 aromas and flavors. We don't know, however, if three years is necessary to achieve what we want."

Fire bending is not crticial to the quality of the barrel, if the toasting is done properly. "It's very important that the toasting doesn't sear or singe the barrel superficially," adds de Leuze. "A slow toasting with deep penetration is what's needed."

The overall barrel breakdown by source of oak at ZD is about 90% American to 10% French. (The French oak is mostly used in the Pinot Noir program, because it adds a spicy note, when heavily toasted, that de Leuze likes.) Coopers used are: Blue Grass, Demptos, Barrel Associates, and Independent Stave.

ZD preps new American oak barrels by filling them with cold water, soaking for 24 hours, draining and filling with wine. They don't normally shave American oak barrels; it depends on their production level.

ZD's future experiments include working with different curing times and toast levels, and using the results to fine-tune their already successful program. de Leuze expects no major shifts in barrel use to occur in the future.

"We love American oak," concludes de Leuze. "It has its own distinctive flavor which we feel complements our wines perfectly, like a seasoning component in food. American wines and American oak — it makes sense."

Summary

Apparently the major obstacles to satisfactory use of American oak in fine California wines have been overcome. What is needed now is continued research by California winemakers, comparable to that which has been done with French oak for the last 10 years, to determine the optimum geographical areas and toast levels for the American oak to match their particular wines. ■

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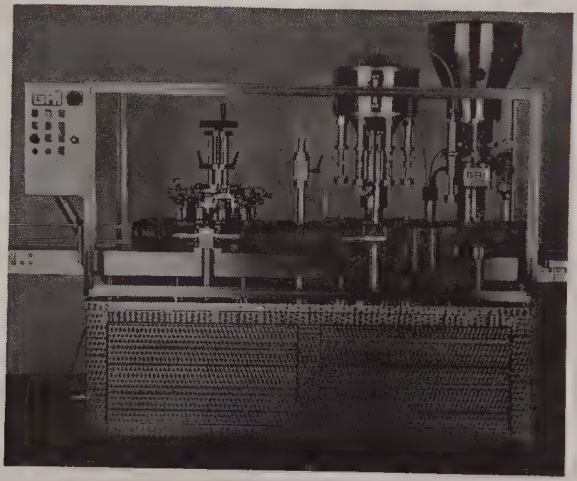

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Photo courtesy of Tonnellerie Francaise

Tonnellerie Francaise

Tonnellerie Francaise was formed in 1980 to satisfy the first demands of winemakers for American oak barrels manufactured in the 'old traditional French style coopering.' Tonnellerie Francaise answered that with a 225L American oak, air-dried, fire-bent, with galvanized hoops, barrel manufactured in Calistoga, CA in the same method and with the identical machinery as their counterpart — Tonnellerie Ludonnaise (Nadalie).

Tonnellerie Franciase was fortunate to find 5-year air-dried oak at the beginning. They began to purchase wood from a supplier in Missouri, who has remained a supplier to this day.

Experience began to show that the 12% moisture content desired in wood for coopering did not require the 3-year air-dried program that France maintains, but was achieved in 18 months. The 18+ months air-drying program was adopted and is continued today.

The turn to American oak barrels in the early 1990s has done three things:

1) Wine styles have changed to integrate American oak as the only wood for some wines and a compliment to French oak on other wines.

2) Other cooperages in America started to manufacture a 'wine' barrel instead of a 'whisky' barrel — even though that process has some distance to go to accomplish the desired results.

3) Now, French cooperages manufacture in America or ship the wood to Europe, manufacture there, and ship the finished product back across the ocean.

American oak barrels will be used by American winemakers, regardless of the price of French oak — Tonnellerie Francaise started that migration in 1980.

Currently, Tonnellerie Francaise production is primarily American oak. The demand is strong and getting stronger. The wood supply of air-dried material is on schedule. Production has been refined in the last few years to manufacture an American oak barrel with which to make superior wine from Cabernet Sauvignon, Zinfandel, Chardonnay, Pinot Noir, etc.

The standard American oak barrel is 225 liters, air-dried, fire-bent with same wood as the barrel, has eight galvanized hoops, toasted over a small fire for a long time, finished with a sanded surface, and bunghole burned.

Wood sources are from Missouri, Illinois, Kentucky; Pennsylvania; and Oregon. Sizes are: 225-L, 350-L Cognac, or 500-L puncheon in a variety of dimensions. Other options are variety of toast levels; toasted heads; thin staves; and older air-dried wood (limited quantity). Oregon oak is in the experimental stage and developing rapidly. Flavor comparisons are favorable. Supply is increasing.

For more information, please contact: **Tonnellerie Francaise**, 1401 Tubbs Lane, Calistoga, CA 94515, tel: 707/942-9301, fax: 707/942-5037.
Please see our ad, page 39.

Barrel Associates, International

In September, 1986, Rich Davis, then managing general partner of Demptos Napa Cooperage, and Philippe Demptos, agreed to conduct an experiment with American oak from Pennsylvania. The oak was cut and prepared in rough staves in Pennsylvania, and then shipped to a Spanish cooper in Spain for air drying. The oak was air-dried in Spain for 22 months and trucked to Demptos Cooperage in St. Caprais, near Bordeaux to be jointed and prepared for shipment to America.

In California, at the Demptos Cooperage in Napa, the barrels were made in similar toast levels, and given to wineries for experimental use. The winemakers reported the coconutty flavor of American oak as off-putting. However, everyone involved in the experiment felt confident that there was potential in American oak.

As it turned out, it wasn't just the air drying time that had to be investigated. Geographic criteria was reviewed also. In the very late 1980s, barrels were made from wood coming from Alabama, Indiana, Kentucky, central Missouri, southern Missouri, Tennessee, and Virginia. All worked well, but the wood from southern Missouri was much better than the rest. At this time, barrels were being sold in Australia and New Zealand, and with the lighter style wines from this area of the world, certain geographic locations provided wood that integrated nicely with these wines.

Still attempting to find a substitute for French oak at half the cost, attention was then placed on firing of the barrels. Bending an American oak barrel in hot water like Jean Marcel Jaegle does with his DJ barrels was tried. Short toasting times, long toasting times, toasting times by a cooper speaking French, low fire toasting, high fire toasting, toasting using different types of oak, etc. Nothing made an American oak barrel taste like a French oak barrel.

The American oak barrel had a different taste and it was a taste that Australians had come to like. Why not stick with the wood's inherent characteristics and learn to use its spiciness as a way to make more interesting wines?

California customers seemed to prefer wood from southern Missouri. This wood was naturally aged and fired as the customer wished, and while not promising a 'French-like' flavor, these were the best American oak barrels they could be.

By maintaining a supply of wood from one particular area, winemaker clients could replicate the results from year to year. The barrels were coopered in the same manner as French oak barrels.

Currently, most of the oak is purchased from southern Missouri. It is air-dried for up to 24 months and then fired slowly over a small oak fire.

For more information, please contact: **Barrel Associates, International**, 575 Lincoln Ave.#200, Napa, CA 94558, tel: 707/257-0714 or 800-227-5625, and ask for Rich Davis.
Please see our ad, page 11.

Independent Stave Co., Inc.

Independent Stave Co. (ISC) first made barrels for the wine industry in 1973. They were basically uncharred bourbon barrels produced from kiln-dried and steam-bent oak.

In 1979, ISC first attempted toasting barrels for a short period of time using propane gas. In 1980, the hoops for wine barrels were changed from black steel to galvanized.

Research to produce a barrel specifically for the wine industry began in 1987. The first Euro-style, 225-liter barrel was produced in 1988, using fire-bending and open fire toasting. Toasting times were 20 to 30 minutes and the timber was an average of 12 months air-dried. Toasted heads were also introduced in 1988.

In 1989, the number of toasting fires were increased and the length of toasting time increased to 30 minutes. Construction of a new barrel assembly line specifically for wine barrels began in 1990.

In 1991, production of wine barrels on the new assembly line began. The head toasting procedure was changed to enable the head to be open-fire toasted to achieve deep toast penetration. Experiments were set up with California winemakers to determine effects of toasting and air-drying on finished wines. Studies on stave age and toasting at California State University at Fresno were funded.

In 1992, an extended stave ageing program was initiated which allows wineries to secure oak and age as long as they wish. The 225-liter barrel was redesigned, resulting in a barrel with a longer chime, larger bilge, and smoother finish.

The World Cooperage Company was established in 1993 as a subsidiary of ISC to concentrate totally on wine barrels. A major stave ageing project to provide two-year air-dried oak was also begun.

For more information, please contact: **Independent Stave Co., Inc.**, PO Box 104, Lebanon, MO tel: 417/588-4151 or 707/644-2530 (CA).

Please see our ad, page 18.

Canton Cooperage

Canton Cooperage was established in the early 1950's to ship heading and stave wood to coopers around the world (Australia, Spain, Japan, Eastern Europe, and South America).

In the late 1980s, Canton Cooperage began production of a French-style American oak barrel for the U.S. wine industry. In 1989, the Canton barrel was introduced under the representation of Barrel Builders Inc. and in 1992, Cork Associates (Barrel Division) assumed distribution. At that time, Henry Work, one of the former owners of Barrel Builders Inc., became the head cooper for Canton at their Kentucky cooperage.

Canton Cooperage is located in Lebanon, KY, where both the wood drying and manufacturing processes occur at this one facility. Canton owns and operates its own stave mills, located in Kentucky, Ohio, and Tennessee.

Canton sources wood for American oak barrels from Arkansas, Kentucky, Missouri, Ohio, Tennessee, Virginia, and West Virginia. The wood is separated according to regional locations.

Wine barrels are produced in French Bordeaux, Burgundy, and thin stave export styles. The wood is aged for a minimum of two years. The barrels are fire-bent and toasted over long, slow wood fires to insure a deep heat penetration into the staves.

For more information, please contact: Ken Seymour, **Cork Associates Barrel Division**, tel: 707/944-1266, fax: 707/944-1456, PO Box 3454, Yountville, CA 94599.

Blue Grass Cooperage Co.

Blue Grass Cooperage has been selling whiskey barrels, in small quantities, to the wine industry for almost 20 years. In 1993, Blue Grass Cooperage established a wine department with really specific guidelines based on the needs of winemakers.

The quality of wood is the reason that Blue Grass survived in the wine industry, even when Blue Grass was not making quality wine barrels.

In 1993, virtually 98% of Blue Grass wine barrels were produced from Minnesota oak. The tight grain oaks associated with slower growing regions seem to perform best for winemakers.

The most noticeable differences in Blue Grass wine barrels should be reflected in the wines from the 1993 harvest. However, the less evident features that have improved Blue Grass quality are as follows:

1) Wood seasoned and air-dried for 18 to 24 months.

2) Wood hand-selected, targeting for zero sapwood.

3) All wine barrels are toasted over an oak chip fire.

4) Cauterized bung holes.

5) Planed interior and sanded exterior finish.

Both 200 and 225-liter select wine barrels are available.

Additionally, in 1994, an auditing system will be implemented allowing Blue Grass to certify the length of time the wood was actually air-dried.

For more information, please contact: **Blue Grass Cooperage Co.**, 1001 Bridgeway#211, Sausalito, CA 94965, tel: 415/331-5734, fax: 415/332-3604.

Please see our ad, page 54.

Demptos Napa Cooperage

Demptos Napa Cooperage has produced 'French-style' American oak barrels since 1990. The Demptos American oak barrel is coopered in both the 225L Burgundy and Bordeaux style.

Demptos has experimented with the Quercus Alba species from many states within the U.S. and has discovered some of the finest white oak growing regions available. Oak research and effective field/wine studies have directed their interests to a region not larger than 50 square miles. These oaks are tight-grained, slow-growing, and offer the best vanillin and complex flavor characteristics available in American oak barrels.

The air-seasoning and toasting are essential for fine oak cooperage. Demptos practices a minimum of 18 to 24 months air-drying to slowly dry the staves to about 15% moisture. This practice of drying significantly increases the quality of the oak. Not only does the natural weathering of wood leach away undesirable tannins, but it actually increases positive organic compounds like ellagic acids and vanillin.

Demptos barrels are oak-fire bent and toasted slowly over an oak fire in order to caramelize the wood's natural sugars and develop flavors deep in the wood.

Using only the finest materials, Demptos surrounds the finely sanded barrel with high-quality galvanized steel and brands the Demptos logo, toast level, and wood type on every barrel.

For more information, please contact: **Demptos Napa Cooperage**, 849 Jackson St., Napa, CA 94559, tel: 707/257-2628, fax: 707/257-1622, contact: Mark Heinemann.

Please see our ad, page 2.

Tonnellerie Radoux

The first Radoux American oak barrels were built and shipped from France to the U.S. in 1992. Two-year air-dried Missouri oak was used.

In 1993, Radoux American oak barrels were built from a blend of oak from various states (Illinois, Iowa, Missouri, Ohio, Virginia, and Wisconsin) air-dried for 22 months minimum. The wood was personally selected by Christian Radoux with an emphasis on tight grain.

American oak barrels, built in France, are available in the following styles: 225L Bordeaux export, 225L Bordeaux thin stave export, 225L Chateau Ferré (thin stave), 225L Burgundy export, 300L hogshead. The heads are assembled using the traditional Cognac method with wooden dowels.

Radoux American oak barrels have eight galvanized steel hoops with light, medium, or heavy toasting available. Head toasting is standard unless specified otherwise. Medium toast barrels spend 40 minutes over a low oak fire.

For more information, please contact: **Boswell Company**, 1000 Fourth St.#360, San Rafael, CA 94901, tel: 415/457-3955, fax: 415/457-0304.

Please see our ad, page 42.

Seguin Moreau

Seguin Moreau has manufactured French oak barrels since 1850. In 1993, Tonnellerie Seguin Moreau introduced an American white oak barrel now available for purchase. The barrel is available in the following sizes: Bordeaux or Burgundy Export shape 225-litre (60-gallon) and Export or thin-stave style, or as a 300-litre puncheon (also called a hogshead barrel).

The wood is a blend of hand-selected white oak from Ohio, Wisconsin, Illinois, Iowa, Indiana, Michigan, Minnesota, and Missouri. American white oak (*Quercus alba*), from the northern midwest regions of the U.S. is being used because, in general, it grows more slowly and has a better aromatic concentration than the same species grown along the Atlantic seaboard.

Cosmetically, the trees in the northern mid-west resemble those in central France, but there are many physical and chemical differences. The white oak growing closer to the Atlantic Ocean and in the southern mid-west region grows more rapidly with large yearly rings which can be good for bourbon, but certainly not for wine. Physically, this type of wood could be compared with Limousin, a more loose-grained wood from France used predominately for Cognac.

Due to the heavy density of American oak, the staves and head pieces are quarter-sawn. After being quarter-sawn, the staves are sorted to different grades: Wine#1, Bourbon#1, Wine#2, Bourbon#2, furniture quality, etc. All imperfections such as the heart, sapwood, knots, minerals, etc. are rejected. This strict adherence to quality results in the loss of approximately 50% of the wood, which is used in other industries.

Initially, the wood has been air-dried for one year in Missouri, and shipped to France for another year of aging. This is followed by the traditional French coopering process, which includes slow shaping and toasting over a natural, open wood fire.

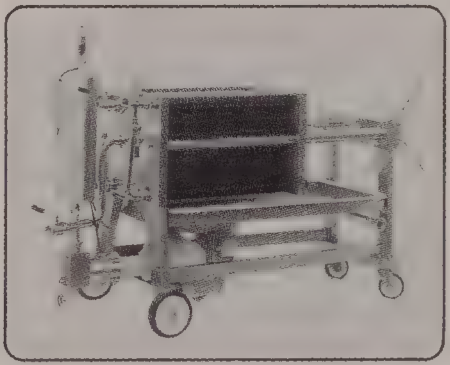
American oak figures largely in Seguin Moreau's future with a commitment to building a cooperage to produce American oak barrels in southern Napa Valley. Construction should begin in early 1994 for completion by year-end. Barrel production should begin in early 1995.

A facility in northern Missouri has been secured to age the wood, as the climatic conditions and latitude are very similar to those of Seguin Moreau's wood yards in France.

As with Seguin Moreau Burgundy blend and Margaux blend French oak barrels, the American oak is an assemblage of wood from different tight-grained oak forests. The reason for this is consistency. The assemblage allows the cooper to match wood grains and qualities to help maintain consistency from barrel to barrel and year to year. Seguin Moreau does not plan to segregate the forests by state in barrel production.

For more information, please contact: **Seguin Moreau**, 2180 Jefferson St., Napa, CA 94559, tel: 707/252-3408, fax: 707/252-0319.

Please see our ad, page 56 ■



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WINE WARS—
An economic analysis of winery/distributor litigation

By John Landon/Kara Boatman, National Economic Research Associates, Inc. (NERA)

Introduction

Our firm, National Economic Research Associates, Inc. (NERA), recently completed a case in which a wine wholesaler, Bronco, counter-sued Glen Ellen Winery for wrongful termination and claimed damages for future lost profits in excess of $4.5 million and total damages of almost $11 million. NERA provided expert analysis and testimony for Glen Ellen Winery. In the main legal action, the winery sued the wholesaler for refusing to pay for wine the wholesaler had purchased before termination.

Hired by the cross-defendant winery, NERA's task was to evaluate liability and damage issues. In our view, wine distributor litigation will become increasingly frequent due to the trend towards consolidation in the wine industry. We hope that a discussion of the case, including the results of our analysis, will give readers a sense of the key economic issues involved.

The plaintiff's claim

The cross-plaintiff wholesaler argued that it was terminated just as it began to earn profits from its distribution of the defendant's wine. The termination therefore foreclosed these profits, damaging the wholesaler and entitling it to collect, as damages, the profits it had expected from distribution for the winery in the future. The plaintiff's economic expert calculated damages by applying typical wine and spirits distributor margins to expected future sales of the brand.

Since there was no written contract, each side had its own view of the damage. The wholesaler's expert assumed that, absent the termination, the wholesaler would have continued to sell the brand for eight years. In his view, this assumption was reasonable since a separate bulk wine contract between the winery and the distributor had eight years remaining.

NERA analysis

In order to assess the wholesaler's analysis of damages, we examined the market for wine distribution in California. Our research revealed two related trends.

First, the California wine market is the most competitive wine market in the United States. Table I presents sample prices for various wines obtained from newspaper advertisements in various major U.S. cities. Retail wine prices in California are significantly lower than those in other parts of the U.S. From a distributor's perspective, this phenomenon results in lower profit margins, as the distributor must maintain competitive prices in order to stay in business. Consequently, we would expect profit margins for wine distributors in California to be low.

We find it unlikely, therefore, that the wholesaler, who distributed in California, would have enjoyed a profit margin such as the one presented in its expert's analysis.

In addition, large volume discount retailers such as the Price Club and Costco have increasingly placed pressure on distributors of strong brand wines in all price ranges to lower their prices. Because these retailers buy in great bulk, they have the market power to exert downward pressure on price. Lower retail prices at these outlets, in turn, cause other retailers to demand concessions. This results in lower margins for the distributors. Again, this phenomenon suggests that distributors such as the cross-plaintiff are unlikely to realize large profit margins in the future.

Another important trend occurring in the wine industry is the movement towards consolidation of brands in a small number of distributors. Because distributor margins are declining for the reasons described above, only the most efficient distributors will remain viable. As a result, any ability to lower the cost of doing business will give a firm a competitive edge.

One of the principal sources of efficiency in a market such as this is termed 'economies of scale.' Economies of scale are efficiencies that result from carrying out a process (such as production or sales) on a large volume scale.

Increasing the scale of operations allows a firm to spread the cost of a large sales force, overhead, and fixed costs over a larger volume of production and, therefore, lowers its per unit costs. This firm, then, can charge a lower unit price for its product, placing smaller firms with higher per unit costs at a competitive disadvantage.

Large multi-brand distributors can achieve scale economies in at least three areas: 1) physical distribution; 2) sales calls, and 3) advertising. A multi-brand distributor enjoys distribution economies because it can load several different kinds of wine on the same truck for transport to a retail outlet. Therefore, the cost of the truck, gasoline and driver are distributed over a larger number of cases of wine.

Second, a salesperson representing a large distributor can market each of the wines in a portfolio during the same sales call. Thus, the cost of a salesperson's time can be allocated across a larger number of units. It is cost-effective for the large distributor to maintain a larger salesforce and it is easier to effectively reach the retailer when selling several strong brands.

Third, a large multi-brand distributor can work with retailers to market several of its brands in one advertisement, allowing it to purchase a larger ad, achieve higher visibility for every brand, and/or lower its per unit advertising costs.

The industry trade press contains numerous articles regarding the current trend towards consolidation. The prevailing opinion seems to be that small distributors will not survive in the new, more competitive environment. Larger firms will continue to grow at the expense of smaller firms because of economies of scale such as those described above.

Our research found several large beverage companies which have decided to consolidate their brands into the hands of one or two large distributors rather than relying on numerous small distributors. This phenomenon suggests that large distributors are better positioned in the current environment, and are likely to grow even larger.

Southern Wine & Spirits Company is an excellent example of the trend towards consolidation in the wine industry. It is one of the largest wine and spirits distributors in California, with more than 100 brands of wine and hundreds of brands of liquor (the plaintiff distributed, at most, 18 wine brands). Since Southern is so much larger than many of its competitors, it is better able to enjoy the efficiencies associated with economies of scale.

California wine prices are lower than those in other major markets

WINE TYPE/LOCATION	PRICE IN DOLLARS
Kendall-Jackson Cabernet	
Washington, DC	$9.69
San Francisco	$7.89
St. Francis Chardonnay (1991)	
Washington, DC	$8.99
San Francisco	$6.98
Hess Select Chardonnay (1991)	
Washington, DC	$7.99
New York Metro Area	$7.99
San Francisco	$6.89
Robert Mondavi Chardonnay (1990)	
Washington, DC	$9.99
San Francisco	$8.98
Caymus Cabernet	
New York Metro Area	$16.50
San Francisco	$13.59
Grgich Hills Chardonnay (1990)	
New York Metro Area	$23.99
San Francisco	$16.99
Chalk Hill Chardonnay	
New York Metro Area	$11.99
San Francisco	$9.88
Kendall-Jackson Cabernet V/R (1990)	
New York Metro Area	$8.99
San Francisco	$7.89
Groth Cabernet (1989)	
New York Metro Area	$14.99
San Francisco	$8.99
Cook's Champagne	
Washington, DC	$3.49
San Francisco	$3.59
Moet Chandon Brut Champagne	
Washington, DC	$22.99
San Francisco	$16.99

Sources:
New York Times (2/10/93)
Washington Post (2/9/93)
San Francisco Chronicle (2/10/93)

Based upon this information and on our understanding of the market's trend towards consolidation, the wholesaler's claim regarding profits seemed unrealistic. In our view, the plaintiff was unlikely to be able to compete effectively in this market, and therefore was likely to continue to sustain losses on this and other brands.

In addition to focusing on the market for wine distribution in California, expert testimony also clashed on length of the future period over which damages should be calculated. We contended that the eight-year damage period assumed was overly optimistic. The typical notice period for termination of distributors in the wine and spirits industry is 60 to 90 days.

While we have discussed declining profits in the beverage distribution sector, we have not yet addressed how those profits are calculated. In order to calculate the profits that result from distributing a particular brand of wine, direct selling costs must be subtracted from revenues, and indirect costs such as overhead must be allocated in a reasonable manner. A true measure of profitability must include both direct and indirect costs.

The wholesaler's expert allocated costs between the defendant's brand and other brands based on the number of cases sold. In our view, this approach is seriously flawed. One wine may be a premium brand that requires a large amount of sales effort to sell a small number of cases, while another may be a table wine that is ordered in quantity with little sales cost. Allocating costs based on sales volume ignores the enormous variation in costs. Based on our analysis, allocating costs according to the revenues associated with each brand constitutes a more sensible approach in this instance. Better expense classification in the books of the distributor would have made the cost allocation easier for both parties.

Conclusion

In this particular counter-suit for wrongful termination, the jury verdict awarded zero damages for lost future profits. (The total damage award was $2.6 million for value of past services rendered to the winery. However, this damage award was more than offset by the $7.3 million award to the winery for unpaid invoices for finished case goods delivered to the wholesaler and money paid for bulk wine undelivered to the winery.) This judgement agrees with our assessment of the future viability of small California wine distributors.

The highly competitive nature of the California wine market and the increased market power enjoyed by large volume customers spell lower profit margins for California wine distributors. In addition, the trend towards consolidation in the industry suggests that the market is and will continue to be dominated by a few large distributors who are in the best position to exploit economies of scale. For small distributors, such as the plaintiff in our case, earning sufficient revenue to cover costs will prove to be an increasingly difficult task. ■

(At NERA, we specialize in the study of firms and industries, and much of our work involves the assessment of damages in commercial litigation. NERA can be contacted at Four Embarcadero Center, San Francisco, CA 94111, tel: 415/291-1000.

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By R. Corbin Houchins

Dollars and cents of distributor litigation

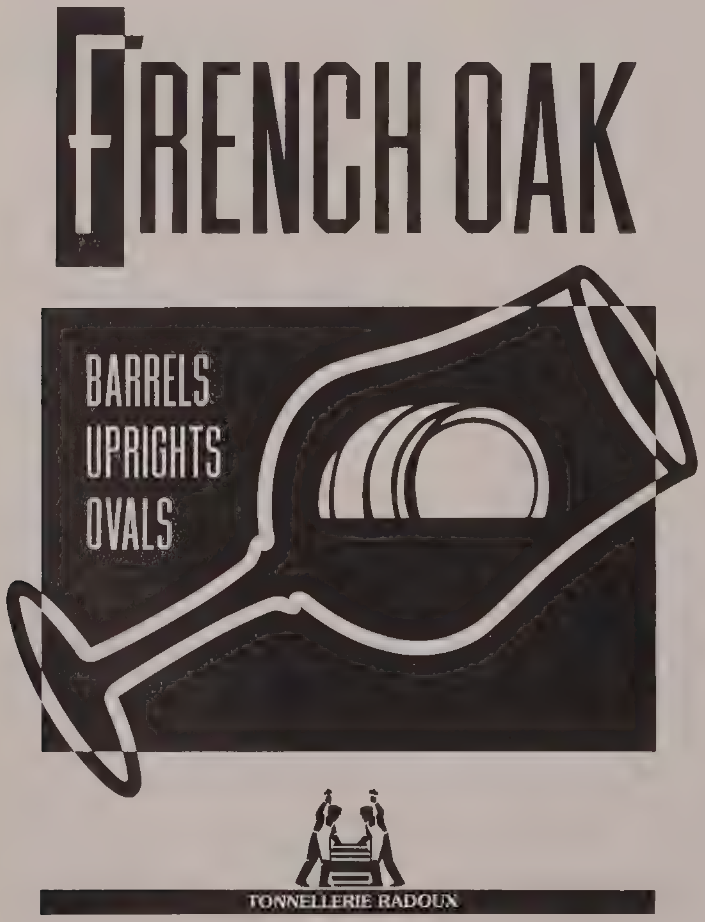
Litigants need economists to assign concrete values to rights that are vindicated in court. However, the rules and assumptions of the legal system are not necesarily scientific. The analysis of the Glen Ellen-Bronco distribution termination case by John Landon and Kara Boatman of NERA illustrates both points.

On the subject of the necessary expertise supplied by economists, the authors demonstrate how a firm with economic know-how identifies the controlling arithmetical relationships, applies them to assumptions based on the facts of the case at hand, and produces numbers that a jury can consider in assessing damages if it believes the winery wrongfully harmed the wholesaler. Where law and science depart is in translating the messy human facts before the court into arithmetical assumptions.

Pick a reality

On the question of what assumptions and rules apply, the wholesaler's lawyer asked his expert to assume that the economic activity requiring sales of the product to the wholesaler would have gone on as long as the parties' other business dealings and would produce profits equal to a past industry average. The winery's lawyer countered with the fact that the parties were not obliged to keep the distribution arrangement in force for as long as their other relationship continued. His expert was asked to take into account the right of the winery to terminate on much less notice than eight years and to apply the market factors that might be expected to reduce the earnings rate by which the time period is to be multiplied. Not surprisingly, the two economists, following the roles of the courtroom, produced substantially different numbers.

In termination cases, the money being fought over is the sum required to put the wholesaler in the position it would have been if the winery had continued supplying it with wine. Ordinarily, the case involves: 1) a date on which the winery refused to fill the wholesaler's orders (*i.e.*, 'terminated' the arrangement), 2) a later date that the wholesaler argues is the earliest date on which the



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winery could have terminated without breaching an obligation to supply wine, and 3) disagreement over what is the real earliest lawful date and how much the wholesaler would have earned, if anything, if sales had continued until then.

To the winery's lawyer, the question is not how long such relationships usually continue, but how much notice of discontinuance the purchaser is entitled to by law before the seller can stop filling orders. The difference is that the statistical approach looks at what historically occurs in a universe composed of a number of suppliers and wholesalers, while the legal system tends to operate in terms of limits imposed on the individual parties.

The world according to defense counsel

The winery lawyer will proceed from the assumption that the supplier would continue to supply goods not for a statistically normal time, but for as short a time as the law will allow. In general, the value of that number is limited by two variables: 1) the length (or 'term') of the agreement, if any, and 2) the minimum amount of time which the law requires between the date of the seller's informing the buyer that sales will be discontinued *before* the end of the term and the date of actual discontinuance ('notice of termination').

To illustrate the limiting variables, if an agreement is for five years and provides that it may be terminated before expiration of its term only if the Royals win the World Series, and then only on three month's notice, we can reduce the economists' time assumptions to a manageable number of scenarios. There is no right to have experts testify about values over a period exceeding five years, because even if 99.9% of such contracts are renewed in the real world, the wholesaler has no right to assume the winery would renew this one. On the low side, there is no opportunity to talk about periods shorter than three months after the next World Series.

Written agreements for wine distribution generally specify a term, the conditions for termination, and the amount of notice of termination required, which may vary depending on the reason to terminate. Typically, an agreement is terminable with little or no notice in case of breach of a material promise by the other party, and terminable on longer notice if the termination is for a less weighty reason or simply because one party has changed its mind. In several states, special laws passed through the efforts of wholesaler lobbyists may prevent contracts from having an expiration date or from being terminated without administrative proceedings, penalty payments, and/or extraordinary circumstances.

Handshake agreements and other expensive luxuries

In the absence of a written agreement (always a disheartening phrase if one is interested in cost containment), there are several directions in which a fact-finder might proceed in deciding whether the agreement is for a definite term and how it may be terminated. Assuming there are no special wholesaler laws to deal with, the enquiry involves the following steps:

> First, is there an oral agreement on the subject? If so, does it meet the technical legal requirements for enforceability?
>
> If the answer is not yes to both those questions, is there an implied agreement? Implication of contract terms can arise from conduct of the parties or from standard industry practice. In Glen Ellen-Bronco, the wholesaler's ex-

Continued on page 54

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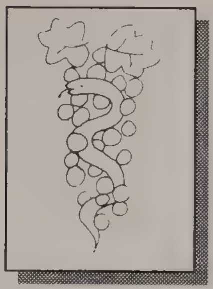

By Wells Shoemaker, MD

WARNING — This health may be hazardous to your wine

The slender and whimsical threads of science can be woven into either a cradle or a noose. The quick-draw hand of the media, the vested interests of industry, and the tin badge of the true believers can twist a new research development into a baptism or a lynching. Which will it be for us?

Federal statute prohibits winemakers, brewers, and distillers from making claims that might suggest healthful rewards for the consumption of one of their ethanol-containing products. Until recently, this muzzling applied regardless of the truthfulness of the statement. Make a claim — lose your license.

It's no secret that this gag order has rankled many winemakers and perhaps piqued a few students of the Constitution, particularly in the face of an expanding wealth of scientific data that smiles upon moderate drinking while continuing to frown upon the abuse of alcohol.

Recent BATF rulemaking allows vintners some slightly greater freedom of speech, but at the risk of sounding like a heretic, I don't think the BATF restriction really hurt us that much. In fact, it may still save us from having to eat crow with our Cabernet.

The body of biomedical knowledge doubles in less than a decade, and the rate is accelerating. Enduring medical 'facts' may have a short life, indeed. Many medical sacred cows of 25 years ago (when I was pursuing my license to make health claims) are now heaps of bones bleaching at the side of the road.

If we leash our future to something as dynamic, changeable, and frankly imprecise as medicine, today's popular and exploitable 'fact' may turn and bite us without remorse when tomorrow's revelation hits the press.

Let's look at two examples, one a fictional distortion of the resveratrol story, and the other 'truth in process' regarding breast cancer and alcohol.

Case one: Old news with a fictional twist

Dr. Leroy Creasey and his co-workers at the Cornell University Plant Sciences Research Center in New York spent a decade quietly studying the natural defenses of commercial fruits. Grape leaves produce the phytoalexin *resveratrol* to retard attack by fungi. Dr. Creasey identified this natural material as the same substance in an Asian herbal remedy which, among other health claims, lowered cholesterol.

Dr. Creasey's team found resveratrol in the grape skins as well as leaves, and the curious scientists then investigated whether resveratrol could be found in wine. Sure enough, there it was! The amounts were higher in red wines than white, as expected, and also higher in wines made from grapes in mold-stressed growing conditions. Heavy fining and filtration reduced the resveratrol content.

Dr. Creasey and associates published their findings in late 1991 in a sparsely read scientific journal, right on the heels, by sheer coincidence of the *Sixty Minutes* television show which made the 'French Paradox' a household phrase.

The wine press snapped up resveratrol like a hungry trout in the May fly hatch. Many enthusiasts felt Creasey had found the 'slam dunk' — the conclusive and proprietary molecular explanation for the longevity of moderate wine drinkers.

One trade organization representing French winegrowers in a region well-known for its red wines boldly proclaimed that, "their wines had the highest resveratrol content of any tested."

It would have been interesting to watch these growers squirm if another researcher had subsequently published a study showing that, besides lowering cholesterol and potentially preventing heart attacks, *resveratrol caused impotence.*

Fortunately, this latter speculation is a complete (and malicious) fabrication.

We now know that resveratrol is only one, and probably not the most important, of many phenolic compounds in wine with potentially healthful biological effects on human blood vessels and fat metabolism. Some of these compounds have antioxidant properties which may be biologically important in doses found in wine, and others may turn out to be test tube flukes. Some tannins, on the other hand, may prove to be a nuisance, implicated in red wine headache.

The second case looks at an issue that goes well beyond nuisance.

Case two: Does alcohol cause breast cancer?

The answer is: possibly, in some women. Breast cancer causes 4% of the deaths of American women. This is a small fraction compared to the 50% who die of heart disease, but that statistical mismatch is a small consolation to an individual wearing a paper gown on a narrow table.

In 1987, two articles appeared side by side in the *New England Journal of Medicine.* The first, from the National Cancer Institute, found a 50% to 100% increase in the incidence of breast cancer among drinkers, even light to moderate drinkers.

The second study, released by Dr. Walter Willett and his colleagues from Harvard School of Medicine, found similar results but, curiously, no significant association for moderate consumers of wine.

In the six years since these studies were published, women's health issues have properly received more emphasis and more funding. No politician would dare appear insensitive to a cancer which singles out women. In addition, the anti-alcohol forces have been stung by the revelations of improved cardiovascular health and longevity among moderate drinkers, and they have furiously plowed the fields of medicine for dirt that will stick on moderate drinking.

New medical studies probing the association of alcohol and breast cancer and tedious reviews of older data by panels of experts have yielded conflicting results. Two of these studies merit special comment.

In 1993, the same Dr. Willett published a report on breast cancer in Spanish women and again found an association with moderate drinking, this time for wine. He cautioned that his study was retrospective and subject to the biases of patient recall and selection, but nevertheless his epidemiological methods are nearly spotless.

Is Dr. Willett some kind of anti-alcohol demagogue with an agenda? No, he is a scientist. He's also one of the principal investigators in the series of Harvard studies on alcohol and cardiac disease that essentially elevated the French Paradox to unassailable stature. If we love what he says in one article, it's hypocritical to bash him for what he says in another. He's looking for the truth, not for sound bites for an ad campaign.

Reversing the field, Dr. Lynn Rosenberg of Boston University, one of the first researchers to alert the world to a possible alcohol-breast cancer connection a decade ago, published a compendious analysis of the world's studies to date in late 1993. Her comments echo those of nearly every other reviewer, namely, that if there is an association for causality, it is a weak one, and that multiple other lifestyle factors may explain this apparent finding in earlier studies. She calls for more studies of better design.

Careful, prospective studies are, indeed, 'in the pipeline,' and this issue will continue to grab headlines.

What should the wine industry position be?

We already know that tall women, corpulent women, and women with a family history of breast cancer have increased risks. Women who delay or avoid pregnancy, as well as those who mature early or reach menopause late, all have elevated risks.

Curiously, women in affluent societies have a significantly higher risk, as much as ten fold (1,000%), compared to poor countries. Furthermore, the incidence of breast cancer has been steadily rising, to a degree that's not explainable simply by better mammography (and certainly not by rising alcohol consumption).

Explanations for most of these factors are not known, although many doctors believe that prolonged estrogen effects are a common thread. Environmental chemicals which coincidentally mimic estrogen effects, unidentified dietary elements, and even hormone changes from our electrically well-lighted lifestyle may all play some role.

There are huge practical difficulties in tracking down the breast cancer issue in a scientifically convincing way. One, of course, is the monumental expense of identifying large cohorts of women, following them for lengthy periods in our mobile society, and analyzing data in an era where university centers are losing their overhead. Another is the lack of lab animal models.

There are no experimental animals with a significant incidence of breast cancer. Humans experience hormonal stimulation of breast tissue for 30 or 40 years, but only a few other mammals even live that long, and those tend to be rather large and live in inconvenient habitats. For them, hormonal stimulation is limited to relatively short periods of estrus and lactation. Furthermore, it's difficult to obtain regular check-ups, mammograms, and post-mortems on gorillas, elephants, and whales.

It is my hunch that scientists will eventually arrive at a concensus that there is a firm — but weak — association between alcohol consumption and breast cancer that will apply to some women with yet unidentified characteristics.

Our industry cannot afford to adopt an overly skeptical public posture on this subject now which might allow our adversaries to haunt us later with the caricature of greedy booze mongers.

We need to insist upon good science, not media fluff, and accept that no one study will tell the whole tale. Women can certainly make intelligent decisions without governmental editing of the message. We need to support the public's access to balanced information, and that means that we may have to share some bad news with equal candor and responsibility as we have greeted the good.

What can a conscientious physician tell a woman about the current state of knowledge about alcohol and breast cancer?

Women with multiple known risks can probably reduce their chance of developing breast cancer by planning their families early rather than late, by breast-feeding their babies, by maintaining normal weight through a well-balanced diet and sensible activity level, by drinking alcohol-containing beverages lightly or

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not at all, and by obtaining competent breast supervision throughout adult life.

Women who do not have a compound list of risks should likewise limit alcohol consumption to light or moderate levels for a host of other reasons, or abstain if they choose. Breast cancer occurs frequently enough in the absence of any recognized risk that all individuals should seek preventive surveillance with equal care.

If a women asks whether alcohol consumption will shorten or prolong her life, the only answer is a statistical one. Light and moderate drinkers will enjoy a 25% to 45% lower risk of heart disease, a tenfold more threatening illness than breast cancer, but no statistic can tell the future for one individual.

What about industry health claims?

Do we need to recite the list of benefits of moderate drinking to sell wine? In my opinion, *yes* in the debate forum, *no* on the label.

For the record, current medical evidence supports the statements that, compared to both abstainers and heavy drinkers, moderate drinkers live longer, largely due to a significant decrease in the number of heart attacks. They also have fewer of the most common type of strokes, fewer gallstones, stronger bones, fewer symptoms of the common cold, better handling of stress, and fewer missed days of work.

Among the senior population, moderate drinkers enjoy better adaptive function and better intellectual skills, which is to say, they live brighter and more independent lives.

Moderate drinkers tend to achieve higher educational levels and greater financial success. In nearly every study where beverage preferences were separated, wine drinkers fared best.

None of these attributes are sinful.

The wine industry clearly needs accurate health information to defend itself against the people who would love to run us out of business using the legislative process. Many of our single-issue adversaries would drape all drinkers with the grim cloak of alcoholism and drug abuse, then garrote us all with punitive taxation and crippling restrictions of trade.

However obnoxious the oversimplifications of the anti-alcohol people, we must remember that they have no federal mandate to be truthful or balanced. They have repeatedly stumbled over the sheer absurdity and unfettered zealotry of their claims. We must learn from that!

Wine isn't a health food and it isn't a medicine. It's too expensive for starters. Certainly, its antioxidant and mineral content is likely to be healthy. The ethanol raises our HDL cholesterol, and tannins may inhibit platelet clumping, but people don't need to buy these molecules in a corked bottle.

Wine makes meals better, and that's something no medicine can do.

We need to promote wine for the timeless virtues that cannot be snatched away by the ebb and flow of medical fads. For thousands of years, people have taken a fickle fruit grown in the gravelly soil, carried it down the hill on their shoulders, and cajoled it into something flavorful to soften the end of a hard day or celebrate the beginning of a new year.

If wine drinkers, on the average, get to celebrate a few extra New Years, that is a happy bonus. If we don't luck out with the extra years, it's adequate compensation to have enriched the years we have with good humor, good food, good company, and good wine. ■

Dr. Shoemaker is a winemaker, pediatrician, and father of three daughters. He makes wine of unknown resveratrol content.

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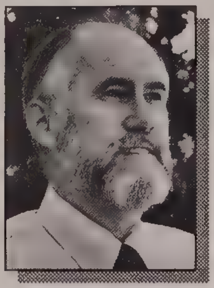


By D.R. Storm, PhD, P.E.

Winning the dietary fat war with zero-fat weapons

Annual physicals always seem to have the power to refocus your attention on what goes into your body, both good and bad. The physician, armed with a computer printout of all your most revealing and innermost blood secrets, definitely controls the post-physical conference.

The litany is always the same: lower your serum cholesterol; raise your HDL; and lower your LDL. At one-half of a century plus 10, you would think that my body could have mastered this balance of blood chemistry without having to forgo all the tasty things generally found on the evil side of the food ledger.

The control of dietary fat intake is a constant struggle for all who would seek longer lives, a trim figure, and who wish to receive accolades from the internist and blood lab for having generated the best numbers.

Maybe you can fool your dental hygienist about how often you floss, but the blood work-up is another story.

I have reduced the control-of-fat war to a couple of simple facts: a) fat makes food taste good; b) substitutes for fat generally do not. There is something about artificial butter-flavored guar gum that short-circuits the taste sensors in my mouth. Low- or reduced-fat products seem to fare much better on my palate meter.

I have done serious consumer research on this subject. I have tried many no-fat products and have corresponded with several manufacturers to tell them how to make their offering more palatable.

If you have found a particularly good non-fat product, please send me a postcard with your choice, and I promise I will give it a serious taste test. (Send to Storm's No-Fat Crusade, PO Box 681, Winters, CA 95694.)

PART I —

The right valve for the right application

More than just a closure

The proper selection of valves for water, wastewater, and process applications in wineries, and in other industrial endeavors as well, involves wide-ranging decisions related to:

- Materials of construction,
- Flow resistance (head loss),
- Function,
- Space requirements,
- Frequency of operation,
- Manual (hand-operated) or remote electrical/mechanical operation,
- Ease of maintenance (and for wineries, cleanliness),
- Efficiency of closure,
- Pressure rating, and
- Closure speed.

While this subject is, I think, more in the mechanical/civil engineer designer's province, this special knowledge can help the winemaker assess existing valving in plumbing systems and evaluate their appropriateness for the function that they serve. It is also important for winemakers and wine production supervisors to understand the physiology of valves, so that proper preventive maintenance and routine repairs can be done with inhouse maintenance personnel.

Valve manufacturers often have technical representatives, easily reached through an 800-telephone number, to help with solutions to difficult or chronic valve repair problems.

Seals of approval

The American Water Works Association, American Petroleum Institute, American National Standards Institute, and American Society of Agricultural Engineers all publish minimum valve construction standards and pressure ratings. The only valves which must meet more stringent standards are those used for fire protection systems and for nuclear power applications.

Valves and other equipment (both electrical and mechanical) for fire protection systems must meet the National Underwriter Laboratories (UL) or Factory Mutual (FM) minimum standards.

Thus, one of the easiest approaches to valve identification and characterization is to check the valve name plate or stamped or embossed imprint on the valve body, which should give the manufacturerer's name, pressure rating, identification/model number and size. The 'standard' certification may also be included, but is only a requirement for UL and FM-rated valves. Armed with the valve model number and size, it is a simple task to determine an unknown valve standard by contacting the manufacturer.

Valve types

Table I is a summary of valve types, application specifics, flow resistance, and other characteristics that identify performance, operation, and function. Note that of the nine basic valve types listed, only four are considered to be of the 'sanitary' type and useful for winery process line applications.

The list of valves in Table I is not necessarily all inclusive. Some valve categories have been excluded because of their limited use. For example, an important sub-category of check valves, ball check valves, can operate in a vertical position while conventional swing check valves cannot.

For further information, the references provided at the end of the column give a complete coverage of all specialty valve types. Part II of this series will discuss several specialty valves that are of special importance in the hydraulics of both water supply and wastewater systems.

Valve anatomy

Fig. 1 illustrates the key components of the valves listed in Table I. There are design differences between valves of the same type and between the many suppliers and manufacturers of valves; however, the basic functional components are the same.

The frequency of disassembling sanitary butterfly valves on storage and fermentation tanks in wineries is as varied as the recipe for the quantity of stems to add to the fermenting must of a top-line Pinot Noir. Armed with the foregoing treasure trove of valve information, you can systematically overhaul all the valves in the winery, and turn an otherwise ugly maintenance task into a useful, training exercise for all cellar workers.

Part II of this series will discusss surge valves (do you need one?) and the market pitfalls in bogus valves and how to spot them. Part II will also examine the used/rebuilt valve business and how to avoid getting 'burned.' ■

David Storm is a consulting civil/sanitary engineer, specializing in winery utilities, and the owner of Winters Winery.

References

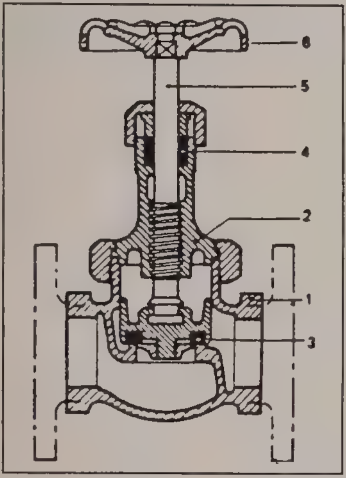
1. Specify the Right Valve Now, Avoid Problems Later. Miles, R.S., 1990, Consulting Specifying Engineer, August 1990, pp. 70-74.

2. Handbook of Valves, Piping, and Pipelines. Waring, R.H., 1982. Gulf Publishing Co., 1st Edition, Houston, TX

3. Valve Selection and Specification Guide. Mervick, R.C., 1991. Van Nostrand Reinhold, NY, NY.

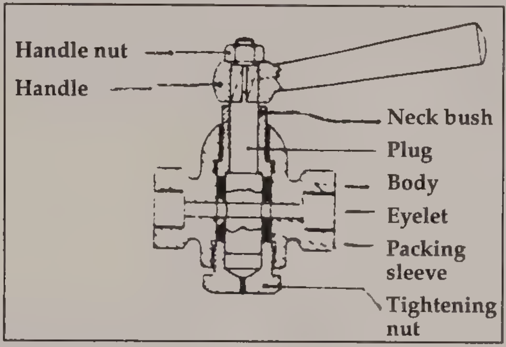
Figure 1 Valve Anatomy [Adapted from Ref (1), (2) and (3)]

Note: Valve numbers correspond to valve categories in Table 1 (in sequence).

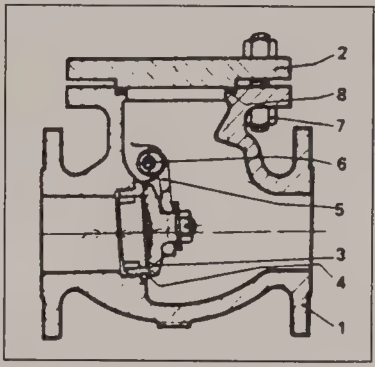


1. Body
2. Bonnet
3. Cover
4. Gland packing
5. Stem
6. Handwheel

1. Screw-down globe valve

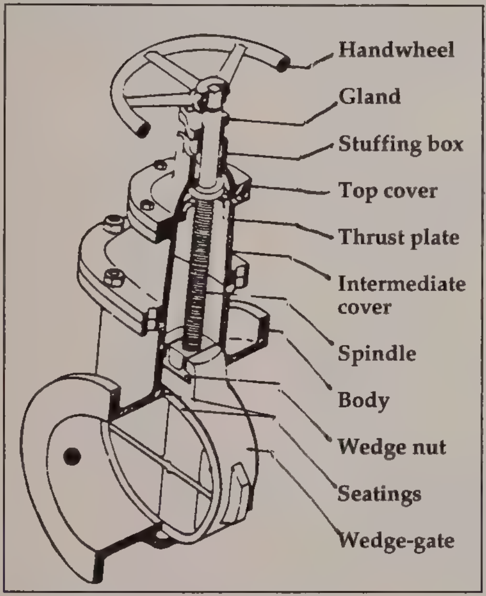


2. Parallel plug valve

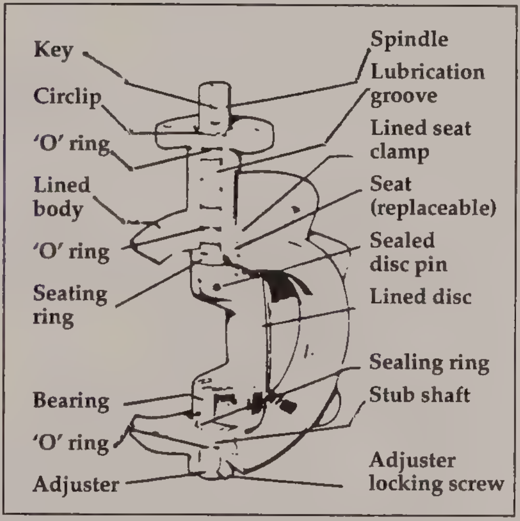


1. Body
2. Cover
3. Disc (flap)
4. Seat ring
5. Hinge
6. Hinge pin
7. Cover bolts
8. Cover seal

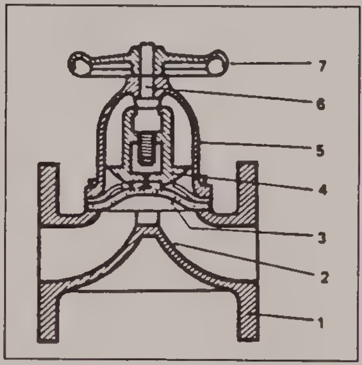
3. Swing check valve



4. Solid wedge gate valve.

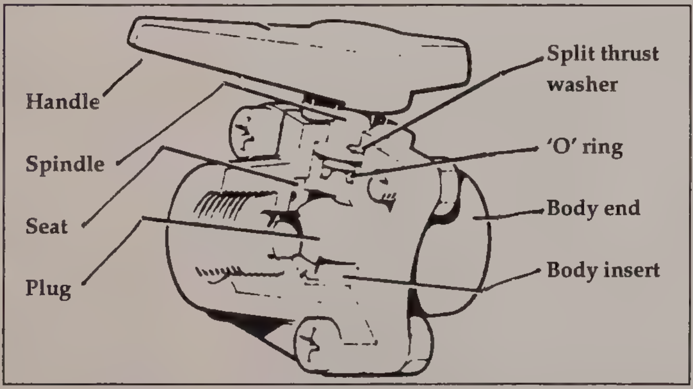


5. Wafer type lined butterfly valve.

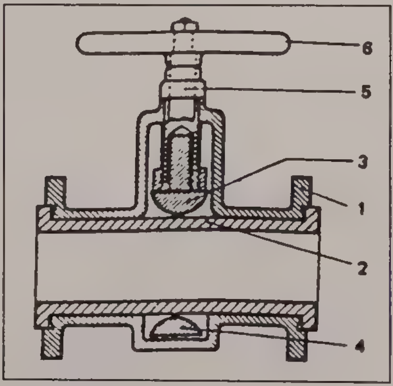


1. Body
2. Weir
3. Diaphragm
4. Diaphragm movement
5. Bonnet
6. Spindle
7. Handwheel

6. Weir type diaphragm valve

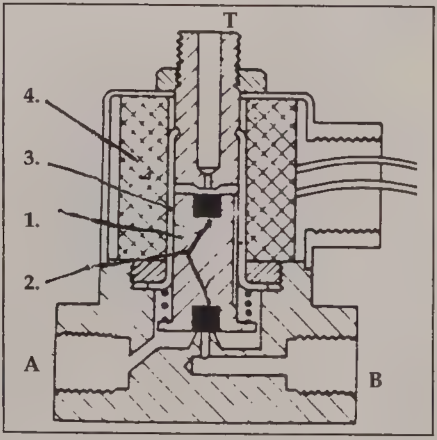


7. Saunders 'MC' type lightweight ball valve.



8. Typical pinch valve.

1. Body
2. Flexible tube
3. Upper pinch bar
4. Lower pinch bar
5. Spindle
6. Handwheel



9. Glandless solenoid valve.

1. Plunger
2. Synthetic seats
3. Sleeve
4. Coil

A. Cylinder
B. Pressure
T. Exhaust

TABLE 1. Valve Types, Applications and Characteristics
[Adapted from Ref. (1) and (2)]

Valve Category	General Application(s)	Actuation	Remarks	Full Open Flow Resistance	Throttling Applications	Closure Speed	Bottle-tight Shutoff	Sanitary (Cleanliness)	No.*
Screw-down stop valve (globe valve)	Shut-off or regulation of flow of liquids and gases (e.g., steam)	(i) Handwheel (ii) Electric Motor (iii) Pneumatic actuator (iv) Hydraulic actuator (v) Air motor	(a) Limited application for low pressure/low volume systems (b) Limited suitability for handling viscous or contaminated fluids	High	Yes	Moderate	Good	No	1
Cock (Plug)	Low pressure service on clean, cold fluids (e.g., water, oils, etc.)	(i) Usually manual	(a) Limited application for steam services	Low	No		Good	Yes	2
Check valve	Providing flow in one direction	(i) Automatic	(a) Swing check valves used in larger pipelines (b) Lift check valves used in smaller pipelines and in high pressure systems	Low	No	Fast	Poor	No	3
Gate valve	Normally used either fully open or fully closed for on-off regulation on water, oil, gas, steam and other fluid services	(i) Handwheel (ii) Electric Motor (iii) Pneumatic actuator (iv) Hydraulic actuator (v) Air Motor	(a) Not recommended for use as throttling valves (b) Solid wedge gate is free from "chatter" and jamming	Low	No	Slow	Poor	No	4
Butterfly valve	Shut-off and regulation in large pipelines in water-works, process industries, petrochemical industries, hydroelectric powerstations and thermal power stations	(i) Handwheel (ii) Electric Motor (iii) Pneumatic actuator (iv) Hydraulic actuator (v) Air Motor	(a) Relatively simple construction (b) Readily produced in very large sizes (e.g., up to 18 ft or more)	Low	Slight	Fast	Good	Yes	5
Diaphragm valve	Wide range of applications in all services for flow regulation	(i) Handwheel (ii) Electric Motor (iii) Pneumatic actuator (iv) Hydraulic actuator (v) Air Motor	(a) Can handle all types of fluids, including slurries, sludges, etc., and contaminated fluids (b) Limited for steam services by temperature and pressure rating of diaphragm	Low	Yes	Slow	Good	Yes	6
Ball valve	Wide range of applications in all sizes, including very large sizes in oil pipelines, etc.	(i) Handwheel (ii) Electric Motor (iii) Pneumatic actuator (iv) Hydraulic actuator	(a) Unrestricted bore at full opening (b) Can handle all types of fluids (c) Low operating torque (d) Not normally used as a throttling valve	Low	Slight	Fast	Good	No	7
Pinch valve	Particularly suitable for handling corrosive media, solids in suspension, slurries, etc.	(i) Mechanical (ii) Electric Motor (iii) Pneumatic actuator (iv) Hydraulic actuator (v) Fluid Pressure (modified design)	(a) Unrestricted bore at full opening (b) Can handle all types of fluids (c) Simple servicing (d) Limited maximum pressure rating	Low	Yes	Slow	Good	Yes	8
Solenoid valve	Good for remote, automatic operation. Simple and not expensive.	(i) Solenoid (cell motivated magnetic field)	(a) Used in vineyard and landscape irrigation systems	High	No	Fast	Fair	No	9

*Cross-referenced to Figure 1

WINNING PROFITS WITH GUERRILLA MARKETING—

Timing your marketing properly

By Jay Conrad Levinson

Sometimes a winery actively markets the right wines to the right people in the right media, but the marketing turns out to be a flop because of poor timing.

In order to get the most mileage from your marketing, you've got to be keenly attuned to the right times and the wrong times. To gain a bit of insight, consider ten examples:

1) You've created the perfect mailing package, but it arrives too early in the week when your prospect is thinking of the week ahead or too late when your prospect is thinking of the upcoming weekend. Moral: See to it that your mailing arrives on a Tuesday, Wednesday or Thursday.

2) You've got fine wines, but a limited budget and a lot of competition. What to do? Do your marketing when your competitors have eased up, and you can gain the largest share of mind with the smallest marketing investment. Maybe that will be during what are deemed the slow months, but it's when you can attract the most attention the fastest.

3) Everybody receives Christmas catalogs in September and October. If you sent yours in June or July, you'd get people thinking of your winery then and later on as well. It's a bit crazy, but if you explain why you are mailing at that time, it will make sense to your prospects. Naturally, we're not talking about doing your mailing at Christmas.

4) Keep abreast of current events by watching television, reading newspapers, perusing newsweeklies, and subscribing to publications within the wine industry. Then, tie in your offerings with what is happening at that moment in history. A recession is ugly except to wineries that realize it is an ideal opportunity for them to make sales ... by leaning on existing customers and enlarging the size of each transaction.

Many wineries have the added advantage of their competitors cutting back — opening a new opportunity for the guerrilla winery. If your wines are expensive, explain that during a recession, consumers don't want to risk wasting their money. A premium-priced wine solves that problem.

5) Be careful not to launch your marketing too soon. One of the most common errors is to market before all the bugs have been worked out, before the salespeople know all the facts, before you are ready to fill the flood of orders. Remember that patience is a guerrilla virtue.

6) One of the saddest moments in marketing is the snazzy newspaper story or big-time TV report about the wines that are not yet in distribution. The winery owner is so enthralled at the thought of free publicity that the news is released before people can buy the wines. Disappointed would-be customers won't come back another time, and the media won't give you another splash. Restraint is necessary even with free news coverage.

7) Savvy wine shops and wine bars wait a month before having their grand openings. If they don't, customers will come flocking in to be greeted by untrained salespeople, poorly stocked shelves, slow delivery times, clumsy sales procedures and messy surroundings. Polish these items to perfection before your grand opening — or it won't be so grand.

8) Telemarketing calls that don't get through or that reach answering devices waste time and money. Find out when your prospects are most likely to be at the phone and do your telemarketing then. It may be at 11:00 a.m. for restaurants and at 4:30 p.m. for retailers. The first goal of a phone call is to reach the prospect.

9) Deal quickly with customer requests, orders, and complaints. People revere their time these days more than ever. Revere it with them.

10) Never be in a rush to create your marketing materials. While they are being developed, keep in mind that if you aim for quality, economy, and speed, you can achieve any two but not all three simultaneously. ■

(Jay Conrad Levinson is the author of the best-selling Guerrilla Marketing books and The Guerrilla Marketing Newsletter. To order or request a free brochure, call 800-748-6444. In CA: 415-381-8361.)

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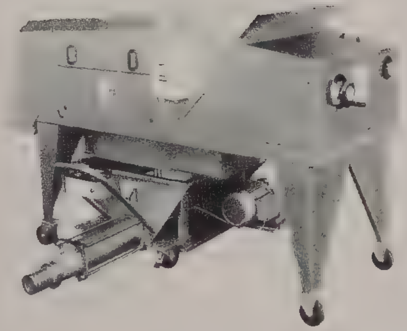

By Dr. Richard Smart

PART I

Choosing a trellis system

Introduction

I have been known to frustrate some of my clients. Imagine the situation: You, the vineyard owner, have just installed (after months of work and buckets of money) a new trellis system on 200 acres which looks beautiful. The soil is freshly cultivated and the young vines are growing well. The posts and vines are in beautiful lines stretching as far as the eye can see... And you want to show it off to this funny-sounding consultant who claims to know a thing or two about trellises.

My first comment to the vineyard owner might be: "You sure have done a fine job of installing this beautiful vineyard, but..."

"But what," responds the owner. The consultant continues, "Why did you put your training wire at this height?" Sometimes the question might be: Why have you used this row spacing? Or this vine spacing? Or maybe, why have you used this end assembly? And particularly, why have you chosen this trellis system?

In any event, despite the question, the vineyard owner is starting to break out in a sweat, thinking, "My God, do you mean to say I have to change some of this?"

We need to realize that in planting a vineyard, and installing a trellis system, we are making a decision that will affect us for a *long* time. We should plan on a vineyard having an economic life of 20 to 40 years, and a lot of changes may occur during that time which will affect our management decisions.

The fruiting variety may need to be changed, in which case, the vineyard can be top-grafted over. If rootstock preferences change, the vineyard will likely need to be replanted, but the trellis system can often be salvaged for re-use.

Mechanization methods will likely change, and I can confidently predict this will be towards more, rather than less, use of machines. There will be more mechanical harvesting, pruning, and perhaps shoot positioning in the future.

Vineyards requiring high labor input, leading to high-cost viticulture, will become tomorrow's dinosaurs. Vineyards will need to become more cost-competitive, as wine is becoming increasingly considered an item of international trade. The local market of every country is the export market of another country. And, in a similar sense, so will grape production costs become more internationally aligned.

Because we cannot accurately predict the future, we need to make allowance for change to occur in our original vineyard design. That is, we need to build flexibility into our vineyard design.

Guiding principles

1) Row and vine spacing

First, you have to assess your vineyard site potential, which is the capacity to support vigorous growth. Is the soil deep? What is the vigor of adjacent vineyards? Will the vineyard be irrigated? Are the

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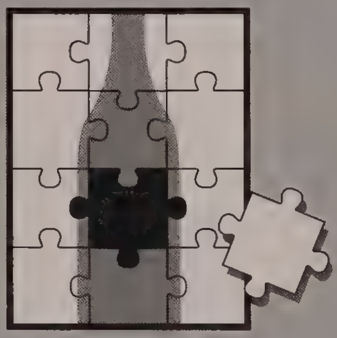

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varieties of rootstock and scion used of high, medium, or low vigor?

If you consider the site potential high, then use wider row and vine spacing. This will allow enough space for horizontally divided trellis systems like the GDC (Geneva Double Curtain) or lyre, and for pruning to enough buds to produce a balanced vine. When I say wider row spacing, I mean 12 feet between rows and vines spaced 8 to 12 feet apart.

For lower potential sites, row spacing can be eight feet, and vine spacing four to six feet. With these narrower rows, you will be restricted to vertically shoot-positioned systems such as the Scott Henry or Smart-Dyson, or the non-divided VSP (Vertical Shoot Position).

2) Row orientation

The normal preference is for north/south rows, as vineyards so planted have a higher yield potential due to increased sunlight interception. However, other factors often over-ride this consideration. Normally, vineyards must be planted parallel to ranch boundaries, and with sufficiently long rows for economical operation. In windy locations, plant rows at right angles to the average wind direction, as this makes wind protection easier. One of the simplest and cheapest ways of doing this is to put wind cloth on the vineyard posts, as shown in the book, "Sunlight into Wine", page 84.

3) Post and wire height

This is an important consideration from a flexibility viewpoint. End posts must be substantial, as is common in modern Californian vineyards, but not the old staked ones. Intermediate posts can be up to 26 feet apart or so, and should not normally be shorter than six feet above ground. Stakes at each vine are not necessary, as vines can be trained up a string or thin bamboo.

The height of the training wire is critical. I usually recommend to my clients to put the first wire at say 42 or 43 inches above ground and on the down-wind side of the post if the Scott Henry or Smart-Dyson is to be used. This makes the downward shoot positioning easier, as explained in "*Sunlight into Wine.*" This will allow a lot of flexibility in future trellis design. If unsure about the appropriate trellis design for the site, one can begin with say the VSP, and at anytime in the future, switch to Scott Henry, Smart-Dyson, lyre, or perhaps GDC.

Another important consideration is for the height of the post above the fruiting wire, if vertical shoot positioning is to be used. To keep the shoots straight upright for accurate trimming requires two pairs of foliage wires, and a minimum of about 18 inches of post height. Putting the wire too high is a bigger problem than too low, as it is always easier to train the vine upwards.

Conclusion

A future column will discuss factors which should be considered when choosing between trellis systems.

The moral of the story is to think ahead. What may be the requirements of the vineyard in the future? Be guided more by the newer trellis systems in your neighborhood than the old and traditional. Do not be deterred by the extra cost of putting in proper end assemblies, or enough posts and wire. As long as you follow reasonable guidelines, you will not waste your money. ■

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THE WINE LAWYER

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pert, in effect, deduced an implied term of eight years from the conduct of the parties in entering into an eight-year contract for a collateral business relationship.

If the parties have not agreed (expressly or impliedly) on a notice period, but the fact-finder concludes there was an agreement for successive performances over a period of indefinite duration, then the issue is probably governed by the Uniform Commercial Code provision requiring notice of discontinuance that is 'reasonable' (another term to strike fear in the hearts of the cost-conscious). What then would be reasonable under all the circumstances?

Even when the time period for calculating damages is established, the legal system is unpredictable in setting economic performance variables on a scale from gloomy to rosy. The wholesaler is always entitled to offer an optimistic set of assumptions (so long as they can be articulated and are not outside the bounds of rationality). Moreover, in most courts the wholesaler can argue that the winery wrongfully denied the wholesaler the opportunity to continue selling the goods and, by luck and pluck, to defy the odds and out-perform the most likely projections, and therefore should pay according to the most optimistic economic view.[1]

Finally, one should not leave the subject of economics without mentioning the cost of economists. It is not unusual in contract termination litigation to incur six-figure expert witness fees, and expenses higher than that raise no eyebrows in antitrust cases. The cost of proving the other side's expert wrong frequently exceeds the amount in controversy, and the entire controversy often could have been averted by two sentences over the parties' signatures.

Gamblers Anonymous?

In sum, do not conclude that damages awarded in distributor termination cases are limited by objective economic factors.

Although, in most litigation, the plaintiff must show it would have earned the money before the court will require the defendant to pay it, juries and judges are swayed by a wide range of factors, proper and otherwise, and the vagueness of concepts such as reasonableness invites unscientific outcomes. Any business selling goods to distributors without having the key variables well buttoned down in writing is betting on a roll of the dice. ■

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[1] To note in passing a complication that we can't discuss in detail here: If the wholesaler has a case for the termination having been for an illegal purpose, such as a desire to control resale prices or to monopolize a market, the winery's economist may not be able to bring in even the most elementary scientific principles to water down the wholesaler's economic assumptions, such as price elasticity of demand.

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CLASSIFIED ADS

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